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Executive Summary

Overall the findings suggest there are potential benefits of Body Worn Video (BWV), although those related to criminal justice outcomes were not fully realised during the timescales of the trial and need the support of criminal justice partners to be achieved.

- BWV can reduce the number of allegations against officers, particularly of oppressive behaviour. Complaints related to interactions with the public also reduced and, although it did not reach statistical significance, the trend in overall **complaints** was consistent with these findings.
- There was no overall impact of BWV on the number or type of **stop and searches** conducted. In addition, there were no differences in officers' self-reported behaviour relating to how they conducted stops.
- No effect was found on the proportion of **arrests** for violent crime. When an arrest had occurred, there was a slightly lower proportion of **charges** by officers in a BWV team.
- There was no evidence that BWV changed the way police officers dealt with victims or suspects.
- The Public Attitude Survey found, in general, London residents are supportive of BWV, with their opinions of the technology positively associated with their views of how 'procedurally just' the police are, and their confidence in the MPS.
- Officers reported a range of innovative uses of BWV, including professional development; use of intelligence; and sharing information with partners and the public.

Background

Some early evaluation work undertaken in the United Kingdom and the USA, has shown promising evidence that BWV can increase the proportion of violent incidents which end in a criminal justice (CJ) outcome and reduce complaints against officers. The cluster randomised controlled trial (RCT) reported in this paper tested the impact of BWV on complaints against the police, frequency of stop and search and CJ outcomes for violent incidents in ten Metropolitan Police Service (MPS) boroughs between May 2014 and April 2015.

The BWV intervention involved: training officers to use BWV; allocation of a personal issue BWV; and on-going supervision and guidance on use. In each of the ten MPS boroughs included in the trial, five Emergency Response Teams (ERTs) were randomly assigned to either the treatment group, who wore BWV cameras (two teams), or the control group (three teams). Each of the ten boroughs started the trial at different points in the year-long evaluation, depending on when they received their cameras. Once more than 50% of officers in a treatment team uploaded an operational clip¹, the borough was deemed 'live' for evaluation purposes. In total throughout the trial, 814 officers in 19 teams were assigned to wear cameras and 1,246, in 29 teams were assigned to not receive cameras². Randomly assigning teams of officers to treatment and control groups provides a strong basis on which to draw inferences regarding the effects of BWV, establishing 'cause and effect' relationships, ruling out other explanations. The focus on ERT officers in 10 boroughs means findings cannot be generalised to officers in other roles, boroughs across the MPS or other force areas.

During the trial BWV captured 48,281 recordings, totalling 12,212 hours of video (average 15 minutes per clip), of which 4,678 hours (28% of clips) were tagged as 'evidential' for potential use within the criminal justice system (CJS). Across both the control and treatment groups, approximately 11,300 stop and searches, 261 complaints and 64,355 notifiable crime reports, 16,191 classified as violent incidents³ were included. Officer surveys, observations and interviews were conducted to understand why any changes in outcomes may have occurred, as well as to capture information on context and implementation of the cameras. Victim views were explored using the existing victim User Satisfaction

¹ Operational refers to any clip uploaded that is not categorised or flagged as for training purposes.

² The wrong allocation of a team to the treatment condition in one borough led to the exclusion of two teams from the analysis.

³ Defined as: Serious wounding; assault with injury; common assault; attempted murder; assault on a constable; affray; & violent disorder.

Survey (USS), in addition involvement of victims in the CJ process was monitored using MPS data. Public attitudes were captured through MOPAC's routine Public Attitude Survey (PAS). Findings from a survey of those stopped and searched and sentiment analysis of BWV related tweets could not be included due to extremely low numbers of responses and tweets.

Primary Outcomes

Complaints

BWV can reduce the number of allegations against officers⁴, particularly of oppressive behaviour⁵. Complaints related to interactions with the public also reduced⁶ and, although it did not reach statistical significance, the trend in overall **complaints** was consistent with these findings. Whilst there is no evidence of a change in the quality⁷ and type of interactions between officers and the public, during interviews officers reported particular instances where BWV changed behaviour. Officers also gave anecdotal evidence of using BWV recording to achieve early resolution of potential complaints, where they felt the footage demonstrated limited grounds, which is consistent with BWV officers reporting a feeling of greater protection from complaints⁸ in the survey.

Stop and Search

There was no overall impact of BWV on the number or type of **stop and searches** conducted. In addition, there were no differences in officers' self-reported behaviour relating to how they conducted stops, but arrests as a result of a search are slightly less likely when officers are in a BWV team. Officer surveys showed no difference between officers with and without BWV in their reported use of discretion; compliance with procedures; and self-reported behaviour⁹ during a search. However, officers with BWV were less likely than those without BWV to agree they needed stronger justification for their actions¹⁰. Therefore, rather than affecting officer decision making, BWV may enable officers to feel more confident if challenged. Analysis of interviews suggests officers feel BWV footage can provide support for their justification to search which they did not have previously.

Criminal justice outcomes

BWV did not affect the proportion of **arrests** for violent crime. When an arrest had occurred, there was a slightly lower proportion of **charges** for incidents reported by officers in a BWV team. It is not known if BWV leads to the preparation of fewer, but stronger cases without further exploration of later CJ outcomes at court. When only those cases where BWV officers specifically flagged footage were analysed, a higher arrest rate was found for officers in a BWV team, but there was no difference to the charge rate. This finding could indicate officers were using cameras during arrest to strengthen existing evidence, or officers chose particular types of situation to flag BWV evidence.

Although the statistical analysis suggests BWV had a limited impact on CJ outcomes, officer surveys indicate a belief that BWV helps to collect better quality evidence. However, officers perceive there were blockages in the system that prevented BWV evidence being used in later stages of the CJ process. In particular, officers interviewed felt that BWV could be valuable for incidents of domestic abuse, where footage could be used to show a level of detail and/or emotion not possible in written statements, an impact which may be seen later in the CJ process (for example at court), but has not been possible to capture during the current RCT.

⁴ Each complaint can comprise of a number of different allegations (for example, an officer could be alleged of unlawful arrest and discriminatory behaviour during the same incident – this would equate to one complaint, with two allegations).

⁵ MPS categorise the following types of allegations as Oppressive Behaviour: Oppressive conduct or harassment, Other assault, Other sexual conduct, Serious non-sexual assault, Sexual assault, Unlawful/unnecessary arrest or detention.

⁶ Breach Code A PACE/ Breach Code B PACE/ Discriminatory Behaviour/ Incivility, impoliteness and intolerance/ Lack of fairness and impartiality/ Oppressive conduct or harassment/ Other assault/ Other sexual conduct/ Serious non-sexual assault/ Sexual assault/ Unlawful or unnecessary arrest or detention.

⁷ As measured by officer self-reported behaviour, injury and assault data, and data from the victim user satisfaction survey.

⁸ See Annex B for statements combined to create this factor.

⁹ Including questions in the officer survey specifically constructed around procedural justice principles -the public's perception of fair decision making and respectful treatment by the police.

¹⁰ See Annex B for statements combined to create this factor.

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1. Setting the Scene

The Mayor's Office for Policing and Crime (MOPAC), the Metropolitan Police Service (MPS) and the College of Policing (College) have worked in collaboration to test the impact of Body Worn Video (BWV), on complaints against the police, frequency of stop and search, and criminal justice outcomes. The introduction of BWV was evaluated through a cluster randomised controlled trial which allows strong statements to be made about the impact of cameras because it can test 'cause and effect' relationships. This report provides an overview of the trial, summarises its main findings, and discusses implications for policing policy and practice.



Background

In both the UK and the US, police use of BWV is increasing. The technology is being used in a variety of ways, most often to capture police operational activity first hand, using helmet or vest mounted camerasⁱ. The uptake of the technology may be explained by its perceived potential to assist with a range of policing problems; notably, cameras have been proposed as key to increasing the transparency, efficiency and effectiveness of police conductⁱⁱ. Despite the growing popularity of BWV there is much to be learnt regarding its effectiveness, particularly its role in reducing attrition through the Criminal Justice System (CJS), as well as understanding any impact it has on the nature of police/public encounters. The MPS has previously trialled BWV technology, most notably a yearlong 2008 Home Office funded pilot in four London boroughsⁱⁱⁱ. There have been further local initiatives in eight boroughs, as well as the MPS team at Heathrow^{iv}. However, all previous MPS pilots have been locally managed and not designed or supported in a way that allowed the impact of BWV to be established. This research addresses many of the evidence gaps around the impact of BWV, and provides valuable insight for future pan-London roll out.

Given growing interest in BWV across England and Wales this trial starting in May 2014 sought to test a consistent approach to the distribution of approximately 500 cameras across Emergency Response Teams (ERTs) in ten London boroughs¹¹. The basic premise of introducing BWV was that the presence of a camera and the captured footage would improve CJ outcomes because the quantity and quality of available evidence would increase, thereby supporting victims and witnesses. In addition, it would introduce a layer of accountability for the police and public, which would impact on the quality and nature of interactions - reducing complaints and the number of stops and searches. London's 'Global City' status, with around 31,000 officers^v, means this trial will address an evidence gap on the impact of BWV in a larger UK force.

¹¹ Barnet, Brent, Bexley, Bromley, Camden, Croydon, Ealing, Havering, Hillingdon, Lewisham.

There are **three** primary outcome measures in the trial, each with their own theories for change and evidence base.

1) Complaints

Outcome: BWV cameras will reduce the number of public complaints made against response officers.

Theory for change:

- Officers and members of the public are likely to be aware of their behaviour during contact with each other; and
- Unsubstantiated complaints and complaints with little grounds are likely to reduce because of availability of independent evidence.

Evidence Base:

One prior study has explored the impact of BWV on complaints in a test and comparison site. Operation Hyperion, which introduced BWV to all officers on the Isle of Wight (IoW), found 'lower level' complaints on the IoW reduced by 15% in the period after personal BWV cameras were issued, while the equivalent figure for the rest of Hampshire was a 5% reduction. Data on more serious complaints showed a reduction of 11.5% in complaints on IoW compared to an equivalent increase of 6.9% in complaints for the rest of Hampshire^{vi}.

BWV has also been tested in American trials and pilots to assess its impact on the quality of police-public interaction, use of force, and complaints. The U.S. study in Rialto (California)^{vii} is often cited to demonstrate accountability benefits, with a reduction in complaints (from 24 to 3) and officer use of force (from 61 to 25) when comparing before and after the introduction of BWV. However this study should be understood in its context, of a Californian force with a relatively small number of officers (n=54). Several other studies found similar reductions in complaints, including Mesa (Arizona)^{viii} and the 2007 Home Office^{ix} research in Plymouth. There are a number of limitations with all of these studies which affects the strength of the findings.

2) Stop and search

Outcome: BWV cameras will reduce response officers' use of stop and search.

Theory for change:

- Officers are likely to stop and search only when they are very confident of the grounds; and
- Officers are likely to carry out fewer, speculative searches.

Evidence Base:

There is no existing evidence on the impact of BWV on stop and search practices, with the MPS trial filling this evidence gap. In the UK and globally the decision to search, the compliance with regulations and subsequent interaction between police and the public is a contentious topic, with much research examining the impact on various communities^x. However the effect of BWV, especially within groups who have historically had challenging relationships with the police and who may also experience high rates of stop and search, has not been addressed. Prior general research^{xi} shows there is a link between fairer interactions, an increase in police legitimacy and an increase in public confidence. This could be an aspirational benefit of BWV, as the greater transparency could make interactions fairer, in turn improving legitimacy and confidence. Exploring this aspect of BWV use and public relations is important, as legitimacy and the trust of communities is a key component of crime reduction^{xii}.

In addition, changes in officers' behaviour and the public experience of contact will be measured, it is thought:

- Officers are likely to feel more supported, less vulnerable to complaints, and more confident;
- Officers are more likely to report better interactions and follow expected process;
- Victims are more likely to feel supported and satisfied;
- The public will feel more confident in the police; and

- Interactions with the police will be reported to be better, particularly for specific groups, e.g. those being stopped and searched.

3) Criminal justice outcomes for violent crime

Outcome: BWV cameras will increase the proportion of violent¹² incidents attended by response officers that result in a criminal justice outcome.

Theory for change:

- Officers are likely to capture more and better evidence at the scene;
- Officers are likely to follow expected process;
- Victims and witnesses are likely to participate in the CJ process because of availability of independent evidence;
- Offenders are likely to admit guilt because of availability of independent evidence; and
- Officers and the public are likely to be confident that a conviction will be secured.

Evidence Base:

The quantity and quality of evidence added to a case is thought to be the most direct benefit to using BWV, especially when capturing emotion, recording injuries and victim statements, (particularly to pursue ‘victimless’ evidence led prosecutions¹³).

There is strong evidence of the impact of BWV on CJ outcomes for DA incidents. A randomised controlled trial (RCT) undertaken by the College of Policing with Essex police showed that issuing officers with BWV could be effective in increasing the proportion of detections that resulted in a criminal charge (81% of the sanction detections were charges in the treatment group compared to 72% in the control group). This finding was consistent across all domestic abuse incidents regardless of initial assessment of risk by the control room. There were no differences in incidents being recorded as crimes, or rates of arrest, and too few cases to identify impact on guilty pleas and sentencing at the time^{xiii}.

There is supporting evidence about the impact of BWV in incidents of violence. A 2007 Home Office pilot^{xiv} in one Basic Command Unit in Devon and Cornwall evaluated the use of BWV on improving the CJ outcomes in violence related incidents, including cases of domestic violence. The pilot involved training 300 police officers and Police Community Support Officers (PCSOs) to use 50 head cameras, which were available from a pool to any trained officer on any shift. The use of the cameras was dependent on the officer choosing to wear it and so the results could be affected by a bias. For violent incidents/crime only the Home Office pilot in Devon and Cornwall found an:

- Increase in converting an incident into a crime (71.8% to 81.7%);
- Increase in Penalty Notices for Disorder (and administration detections) (2.4% to 3.9%);
- Increase in charge/summons (10.2% to 15%); and
- Increase in sanction detections (29% to 36.8%).

Since these two studies, BWV has been frequently used in pilots for CJ outcomes, but not all of these pilots have been evaluated, or the evaluations have been limited by the design or size of the sample.

¹² Whilst all crime was monitored as a secondary outcome, it was decided to focus on instances where BWV would have a greater likelihood of impact – namely violence.

¹³ Prosecutions where the victim is unwilling to take part.

All boroughs were ranked accordingly to the above criteria. Some were also excluded based on practical considerations which may have affected their ability to implement the BWV cameras successfully¹⁷.

Team Selection

Teams of officers within boroughs were randomly assigned to the intervention in order to provide a strong basis on which to draw inferences regarding the effects of BWV – a ‘cluster’ RCT design. A ‘cluster’ RCT randomly allocates whole groups of individuals to different conditions being tested. In this instance the cluster or group were ERTs, so rather than individual officers, entire emergency response teams were randomly allocated to receive BWV or not. Once a team was assigned to a condition it applied to all officers in that team – so in a BWV team all officers were allocated to wearing BWV and in a control team no officers were assigned to wear cameras. All five ERTs in each of the ten boroughs were randomly assigned to either:

- the treatment group – to receive a body worn camera; or
- the control group – to not receive a body worn camera¹⁸.

Each of the ten boroughs had two treatment teams and three control teams. Contrary to the exclusion criteria on the previous page, after selection ‘Borough 3’ was subsequently found to have cameras and so had them initially removed for some months, then randomly re-allocated. However, due to the incorrect allocation of a team to the treatment condition, it was necessary to exclude two teams from the analysis – leaving ‘Borough 3’ with one treatment and two control teams.

Randomisation occurred at the beginning of the trial under the assumption all boroughs would go live at the same time and all officers in the teams would be trained and receive cameras. However, when the trial launched in April 2014, the MPS decided a staggered roll out would ensure sufficient centralised resources to train ERT officers and install technical hardware across the 10 borough sites. In practice, the roll out took over 6 months to complete, which reduced the length of the trial in some boroughs (see Figure 1). The length of the roll-out reduced the chances that less frequent outcome measures such as complaints would occur in large enough numbers to detect a significant change between the treatment and control groups (see Annex A for more details on the trial design).

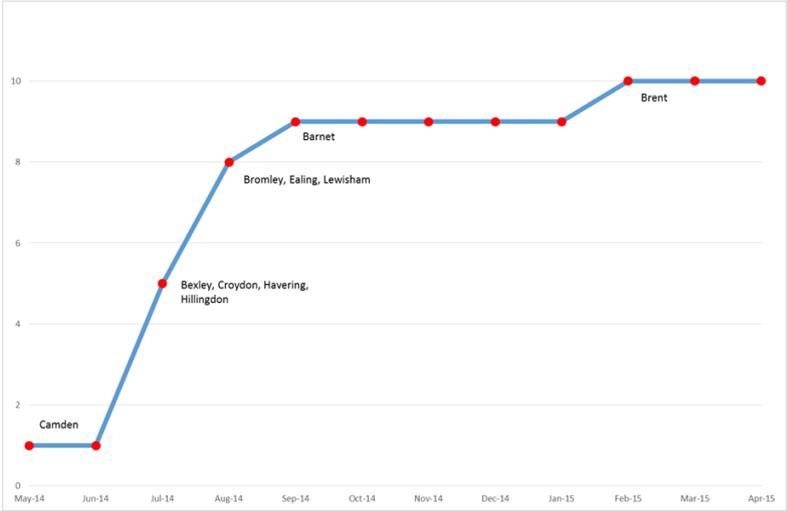


Figure 1: Borough “Go-live” for each month of the trial

Boroughs were deemed to go live for evaluation purposes once more than 50% of officers in a treatment team had uploaded an operational clip¹⁹.

¹⁷ For example, some boroughs were involved in major site relocation and others were participating in other pilots.
¹⁸ These procedures were carried out by College researchers to prevent any selection bias. Each team was given a random number and the two teams with the smallest numbers were selected into the treatment conditions.
¹⁹ Operational refers to any clip uploaded that is not categorised or flagged as for training purposes. In the event that an officer has never categorised or flagged a clip as training purposes, the 4th clip they uploaded is deemed to be their first operational clip, as the majority of officers who had correctly labelled their uploaded clips upload between 1 and 3 clips during initial training.

3. Implementation Learning

This trial tests the impact of BWV in its complex ‘real world’ setting rather than how BWV could work in ideal settings. This is important because interventions that lead to significant improvements in ‘ideal’ settings do not necessarily deliver the same results in the ‘real world’^{xvi}. The results of this trial therefore offer a more accurate picture of the potential impact of implementation of BWV in other forces.

As previously identified^{xvii} documenting learning from implementation is beneficial, so that replication in similar operational settings can better identify and mitigate potential challenges earlier. This trial intended to apply learning from previous studies, which only identified implementation problems at the point of assessing impact^{xviii}.

In order to identify any implementation issues an early feedback loop was set up between the evaluation team and the MPS BWV central team. By the evaluation team monitoring staff survey feedback and limited performance data, timely feedback was provided to the MPS BWV central team. Attempts were then made to rectify emerging issues giving the evaluation the best chance of detecting any measureable change.

Annex A provides more detail on the trial design and challenges. In particular, while the aim was for all officers in the treatment teams to receive the intervention (BWV), in practice not all ended up being sent on training and issued with a camera as intended. In addition, there were implementation challenges; as the frequent movement of staff in and out of the response teams caused an ongoing training gap; the central MPS BWV implementation team having to address potential resistance from officers; and ensure they had the ability to use the technology and access equipment.

A shortfall early on of around 180 cameras and officer churn meant no ERT ever reached 100% of officers fully trained and active in using the equipment. When the in-house training was provided before the roll out in May 2014 officers were positive about the support provided. Although satisfaction regarding support was sustained in subsequent surveys, feedback throughout the trial suggested some frustration, notably around a lack of on-going or ‘refresher’ training and technical support. Three main issues were highlighted with training: a lack of accessible practical and technical support once back on borough (i.e. for effective use of back office functions); that training had focused too heavily on how to use the cameras (as opposed to issues such as *when* to use the cameras); and there was too long between the training and receiving a camera for operational use. This issue was echoed by the BWV central team who identified delays as a result of challenges installing infrastructure.

“I feel that the time between training for the cameras and the borough actually going live was too long. Perhaps a condensed refresher at a briefing would be beneficial for all officers”

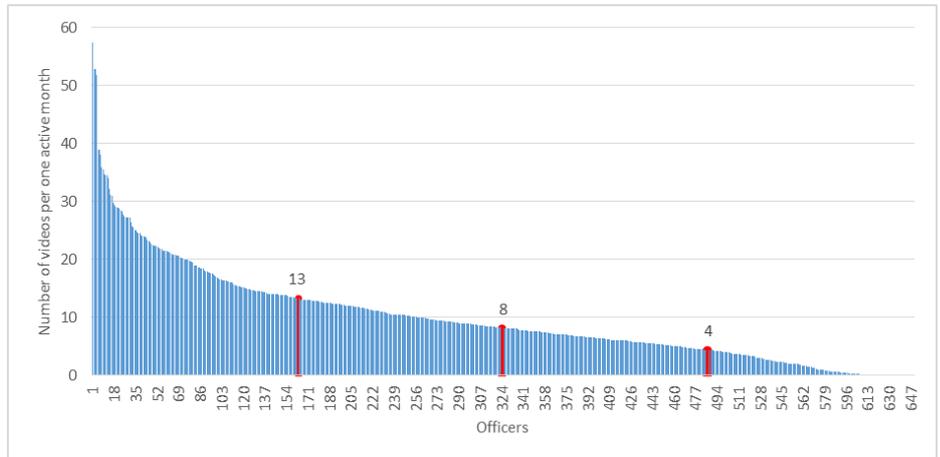
By far the largest implementation risk was the lack of BWV usage by officers, therefore monitoring compliance was critical to maintain the fidelity of the trial. Over the 12 month period of the trial (May 2014 to April 2015) BWV cameras were used to generate 48,281 recordings, totalling 12,212 hours of



video (an average of 15 minutes per recording). Of the recordings submitted, 13,678 (28%), totalling 4,678 hours, were tagged as ‘evidential’ for potential use within the criminal justice system (CJS). This is marginally higher than findings from previous research regarding evidential clips – 22% were found during Operation Hyperion^{xix}.

Figure 2 Average number of clips recorded by each officer per one active month

During the course of the trial, 649 response officers were given a BWV. These officers have been ranked²⁰ by upload rate (see Figure 2). Officer usage varies considerably, with a small portion officers account for a large portion of clips.



The highest average number of clips recorded per month was 58 (230 clips in total) by an officer who was only active for 4 months. Overall, 42% of officers with a camera recorded 10 or more clips per active month, while 26% recorded less than 5 clips per active month, and 6% uploaded nothing during the trial.

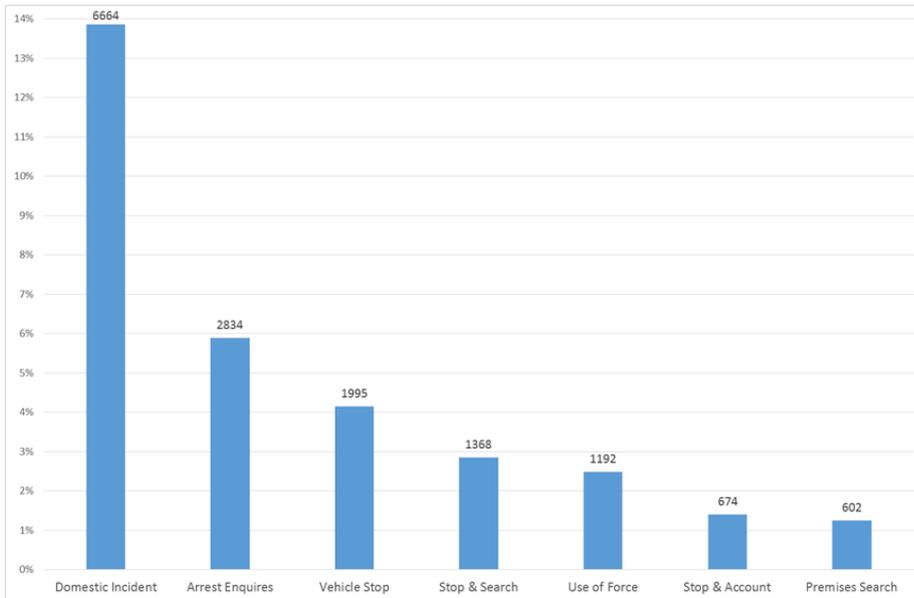


Figure 3 Percentage of overall clips by category

MPS policy makes the use of BWV in a number of defined areas mandatory. Figure 3 displays the percentages of all clips flagged as in one of these mandatory categories²¹.

It is important to note that categories are not mutually exclusive, for example a recording could be of officers attending a domestic

violence incident, making an arrest and deploying use of force.

Of the 48,281 recordings during the trial, footage recorded from mandatory situations varied considerably. Domestic Violence was the most frequently recorded from all the mandatory situations in all boroughs. It was not possible to understand the proportion of mandatory situations that were recorded, or how representative the number of clips recorded are of an officer’s overall activity (see Annex C for a full usage breakdown).

Lack of camera usage may also affect the size of the effect seen in the trial, potentially underestimating the true impact BWV could have if there was total compliance with policy. Making the most of BWV is not just a matter of testing the technology, but influencing the culture in which the technology is used^{xx}. To explore lack of use, officer surveys and interviews were used to understand practical or

²⁰ The rate of clips recorded by each officer per active month, calculated by dividing the total number of each officer’s recorded videos with the number of months they were in the treatment group.

²¹ The numbers are likely to be an underestimate due to the reliance on officer labelling.

personal barriers officers faced when deciding to activate their cameras. The findings suggest there are four broad areas impacting on the use of cameras:

Practical Problems – although officers believed cameras were easy to operate and footage was of sufficient quality, barriers included the bulkiness of the equipment; poor battery life; temperamental connectivity; and the camera positioning on their Met vest, which was particularly awkward when driving.

Technical problems – were in the main a lack of docking stations at local custody suites, with uneven distribution causing logistical difficulties and increased travel times. These are problems that will reduce with full roll out. Lack of access to footage on the street, the need to improve sound quality and having headphones to review footage were also identified.

Lack of organisational support –shortfalls in timely initial and refresher training may have caused gaps and misunderstandings over how to embed the use of videos into current organisational processes. For example, officers believed cameras increased time spent on paperwork, particularly witness and victim statements. However, there was a misconception that written notes should mirror footage – something which although addressed during training, was not consistently understood by officers.

“Having to write word for word what you have said at a scene... [when footage] is already recorded and available evidentially, it seems a duplication and waste of time to then sit and write it all down ... makes case progression slower”

Resistance – Perhaps unsurprisingly, the majority of officers believe they should have more discretion over when to activate BWV. Research has previously identified lack of discretion as a barrier for officers, who see mandatory recording as a lack of organisational trust^{xxi}. Officer interviews in this trial highlight concerns including the perceived increased scrutiny from management and outside agencies (notably courts), with worry that footage would not accurately reflect dynamics relayed at the time. An officer’s ability to exercise discretion during incidents was also frequently mentioned, with officers feeling overly self-conscious and obliged to apply the letter of the law in order to protect themselves from any future reviews. Concerns that BWV affected interactions with the public and colleagues were emphasised in officer surveys, with some suggesting that they affect team morale by increasing suspicion that footage could somehow be used against them.

“...less comradeship at calls as everyone is wary that cameras are on and recording, thus a drop in morale.”

4. Results

Headline Findings: Summary

The cluster randomised controlled trial (RCT), issuing officers with Body Worn Video (BWV) showed:

- BWV can reduce the number of allegations²² against officers, particularly of oppressive behaviour²³. Complaints related to interactions with the public²⁴ also reduced and, although it did not reach statistical significance, the trend in overall **complaints** was consistent with these findings.
- There was no overall impact of BWV on the number or type of **stop and searches** conducted. In addition, there were no differences in officers' self-reported behaviour relating to how they conducted stops.
- Arrests as a result of a search are slightly less likely when officers are in a BWV team
- No effect was found on the proportion of **arrests** for violent crime. When an arrest had occurred, there was a slightly lower proportion of **charges** for reporting officers in a BWV team. It is not known if BWV leads to the preparation of fewer, but stronger cases without further exploration of later CJ outcomes at court. Subsequent analysis isolating the effects in cases where BWV officers specifically flagged a case with footage, showed a higher arrest rate than cases reported by officers not in a BWV team, but no difference to the charge rate. This finding could indicate officers were using cameras during arrest to strengthen existing evidence, or officers chose particular types of situation to flag BWV evidence

This section summarises the findings from the trial. It starts by examining the effect of the intervention on the principal outcome measures, and then discusses the officer survey and interviews, as well as the public attitude information to contextualise the findings. For all primary outcome measures, multivariate statistical models were created to compensate for the effect of the team clustering and to assess to what extent other explanatory factors had an impact on outcome measures when considered alongside the effect of BWV. Explanatory factors in the models included: the demographic characteristics of the officers; factors associated with level of camera use (e.g. time in the trial); and contextual factors (e.g. borough). Use of multivariate models is intended to eliminate the possibility that any potential effects seen in our initial analysis was actually due to another factor aside from BWV.

In addition, exploratory analysis was conducted using chi-square tests to further interrogate data for the primary outcomes and compliment the main results drawn from the multivariate statistical models (e.g. analysis by type of complaint or proportion of searches where an arrest was made)²⁵.

The data for all the analysis came from a merging of data sets from MPS that held incident, complaint, stop and search and officer details and BWV usage information. To support the data analysis semi-structured interviews and surveys of officers were undertaken to help understand their experience of using the BWV cameras. The officer survey was designed to enable comparison of treatment and

²² Each complaint can comprise of a number of different allegations (for example, an officer could be alleged of unlawful arrest and discriminatory behaviour during the same incident – this would equate to one complaint, with two allegations).

²³ MPS categorise the following types of allegations as Oppressive Behaviour: Oppressive conduct or harassment, Other assault, Other sexual conduct, Serious non-sexual assault, Sexual assault, Unlawful/unnecessary arrest or detention.

²⁴ Breach Code A PACE/ Breach Code B PACE/ Discriminatory Behaviour/ Incivility, impoliteness and intolerance/ Lack of fairness and impartiality/ Oppressive conduct or harassment/ Other assault/ Other sexual conduct/ Serious non-sexual assault/ Sexual assault/ Unlawful or unnecessary arrest or detention.

²⁵ Descriptive statistics, and basic statistical tests, do not compensate for any "inherent" complaints rates in the boroughs ('clustering effects'), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data.

control officers' attitudes and self-reported behaviour; respondents were asked the extent to which they agreed or disagreed with a series of statements about their interactions with the public, the organisation and their decision making. No reference to BWV was made in the statements allowing officers in the trial to respond to the same statements, with differences in response directly attributable to BWV. Both surveys and interviews were used to help identify the possible mechanisms of any change (or lack thereof) identified through the data analysis.

As part of the trial a large amount of data was collected and a number of other measures monitored, including public attitudes and victim user satisfaction, which are discussed in the results section. A list of all secondary data sources and analysis can be found in Annex B.

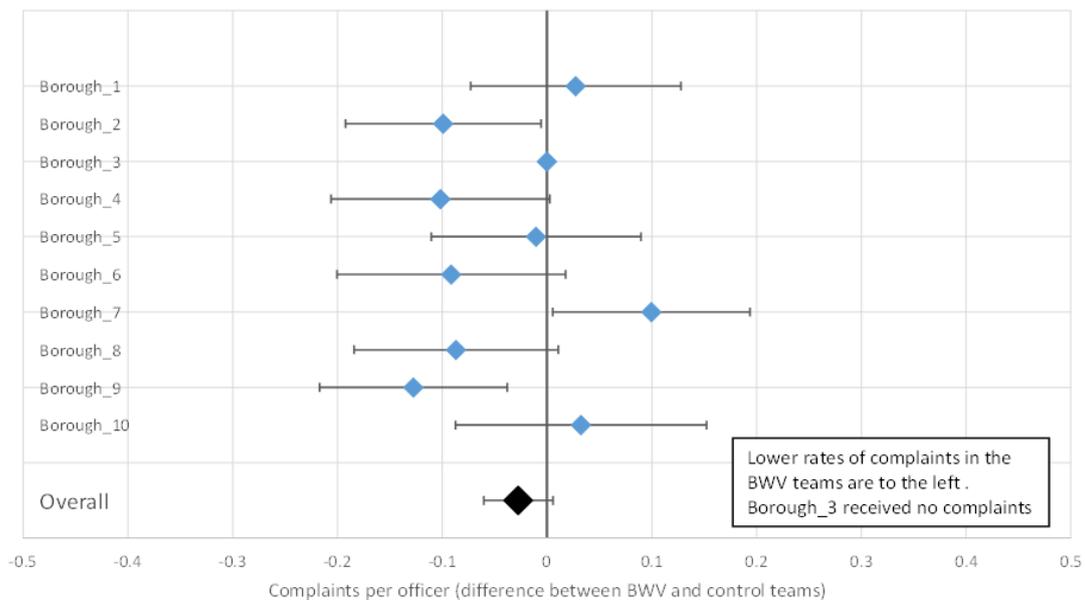
Impact on complaints

The trial tested whether BWV cameras would reduce the number of public complaints made against response officers. During the course of the trial 261 complaints were recorded on the MPS internal database, comprising 462 individual allegations²⁶. This equates to one complaint per officer every 4 years.

The difference between the officer complaint rates in the control and treatment teams in each borough is shown in Figure 4. Blue diamonds represent the individual borough average and the black diamond is the basic overall effect. When the arms of the diamonds cross the central axis (at 0) it indicates the difference between the control and treatment groups is not statistically significant²⁷.

Six of the ten boroughs had on average a lower rate of complaints in BWV teams than their control teams and this difference was statistically significant in two boroughs. Despite a lower overall rate of complaints in the BWV teams, basic analysis²⁸ shows there was not a statistically significant combined effect from all ten boroughs. It should be noted that the small number of complaints recorded during the trial made it unlikely that a statistically significant difference between the two groups would be found.

Figure 4: Difference between the average number of complaints per officer in the control and treatment teams in each borough



Multivariate statistical modelling was performed to rule out other explanatory factors²⁹, and to compensate for the effect of the clustering in the data. Modelling confirmed the difference between treatment and control groups was not significant. The difference only met the 10% significance level³⁰ rather than the more usual 5% level, giving a higher chance that observed differences are a result of sampling error, but providing some evidence that BWV may reduce complaints. When the complaints

²⁶ Each complaint can comprise of a number of different allegations (for example, an officer could be alleged of unlawful arrest and discriminatory behaviour during the same incident – this would equate to one complaint, with two allegations).

²⁷ The black arms represent a 95% confidence interval.

²⁸ Descriptive statistics, and basic statistical tests, do not compensate for any “inherent” complaints rates in the boroughs (‘clustering effects’), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data. Results from more comprehensive statistical modelling are shown below, and these provide the strongest analysis of the data.

²⁹ Gender, number of months in the trial, officer age, number of stops, team and borough.

³⁰ Hierarchical generalised linear model with a Poisson link function and teams within boroughs (BWV, $\beta=-0.29$, $\exp(\beta)=0.75$, $p=0.10$).

are narrowed down to categories linked to police-public interaction³¹ where BWV is most likely to have had an impact, there is a statistically significant difference, with fewer complaints in the BWV teams compared to the control groups³². Although there was no effect when looking at overall complaints, this finding shows BWV may reduce particular types of complaints.

This finding is supported when conducting a range of other modelling, undertaken to further explore the results. Data relating to the number and type of allegations that make up complaints were explored and it was found that there was a statistically significant difference between the two groups in the average number of allegations per officer³³ (0.17 in the BWV group, and 0.26 in the control group), a 33% reduction.

When allegations were broken down by type it was found that the greatest difference between BWV and non BWV teams appeared to be those relating to oppressive behaviour³⁴ and incivility³⁵. When statistically tested there was a significant association between the absence of BWV and officers being alleged of oppressive behaviour³⁶. The odds of an officer in a non BWV team receiving an allegation of oppressive behaviour was 2.55 times higher than for an officer in a BWV team (2% of BWV officers vs. 5% of control officers). However the difference for allegations of incivility was not significant at the 5% level³⁷.

To understand if BWV had a particular impact on officers with a higher than average number of identified behavioural issues, data drawn from the MPS's 'Complaints Intervention Scheme' (CIS)³⁸ was analysed (Chi square). This showed there was no difference in the proportion of officers enrolled, newly joined, or removed from the CIS or had a 'behaviour issue'³⁹ between those wearing BWV or not.

Other Complaints analysis

BWV and non-BWV wearing ERT teams were also compared over a variety of measures of complaints. No significant difference was found across: the proportion of officers in the teams who received a complaint or not during the trial; the proportion of allegations resolved within the trial period; and the time taken to resolve.

From the 462 allegations, only three were found to be substantiated during the entire trial, it was not possible to explore any difference between the control and treatment groups.

Understanding the results

Survey analysis indicated treatment group officers were significantly⁴⁰ more likely to feel protected against complaints⁴¹ than the control group, as their survey responses indicated they felt allegations with little evidence were not being upheld or were resolved quickly. However, exploring the complaints data there was no difference found in the time resolved and too few complaints were found to be substantiated during the trial for analysis to detect any difference between groups. The survey findings that officers feel protected against complaints may not be reflected as strongly in the results due to

³¹ Breach Code A PACE/ Breach Code B PACE/ Discriminatory Behaviour/ Incivility, impoliteness and intolerance/ Lack of fairness and impartiality/ Oppressive conduct or harassment/ Other assault/ Other sexual conduct/ Serious non-sexual assault/ Sexual assault/ Unlawful or unnecessary arrest or detention.

³² Hierarchical generalised linear model with a Poisson link function and teams within boroughs (BWV, $\beta = -0.54$, $\exp(\beta) = 0.58$, $p = 0.04$).

³³ Hierarchical generalised linear model with a Poisson link function and teams within boroughs (BWV, $\beta = -0.51$, $p = 0.03$)

³⁴ MPS categorise the following types of allegations as Oppressive Behaviour: Oppressive conduct or harassment, Other assault, Other sexual conduct, Serious non-sexual assault, Sexual assault, Unlawful/unnecessary arrest or detention.

³⁵ MPS categories one allegation type as 'incivility' - 'Incivility, impoliteness and intolerance.'

³⁶ $\chi^2(1) = 12.97$, $p < 0.001$

³⁷ $\chi^2(1) = 3.067$, $p = 0.08$

³⁸ An officer is enrolled onto the CIS when they have had 3 or more behavioural issue cases (either a public complaint, conduct matter or civil action) in a 12 month period. Each case lapses after 12 months which results in the officer being removed from the scheme.

³⁹ public complaint, conduct matter or civil action.

⁴⁰ Second officer survey: $U = 21678.5$, $P < 0.001$, Treatment Mdn = 4.00, Control Mdn = 3.25, $r = 0.26$ and third officer survey: $U = 30875.5$, $p < 0.001$, $r = 0.21$, Treatment Mdn = 4.50; Control Mdn = 3.75. Mann-Whitney Test.

⁴¹ As measured by responses to the statements, "If a member of the public made a false complaint against me, it would get sorted out quickly", "I'm confident people would believe my side of the story if a complaint was made against me.", "A complaint made against me with little evidence would be dropped quickly." And "I feel protected from malicious complaints when dealing with the public."

the small number received and may also be explained through possible impacts of BWV earlier in the complaints process. Officers anecdotally reported that unfounded complaints were being quickly resolved locally using BWV footage, but there was no data available at the initial contact stage to be able to confirm these claims. BWV may lead to a reduction in recorded complaints due to early resolution of issues with little grounds.

Officers were positive about the impact of BWV on complaints, with survey findings supported by the interviews. When asked to show interviewers footage that sums up their experience of using BWV four officers of the nineteen brought in video clips demonstrating protection from potential complaints, a seemingly high number given the relative rarity of complaints. During interviews some officers said a potential complainant would be aware that the footage would counteract false or exaggerated claims.

“A lot of the time we have a lot of completely made up complaints, not exaggerated truths, completely ludicrous, made up, and I think at the point of that complainant being told that there is body worn footage of their entire dealing, I think a lot of complaints will be retracted or solved really quickly.”

Case Study 1: Protection from malicious complaints

Officers conducted a vehicle stop and were confronted with a hostile and violent suspect who exited the vehicle and threatened officers. As a result of his conduct officers deployed their Taser.

Whilst being booked into custody the suspect stated that both officers had looked at each other and laughed before saying "let's Taser him".

Officer BWV footage was shown to professional standards who stated that officers had no case to answer.

“I don't know whether it'll stop people complaining. I'd like to think it did but even if the level of complaints stays the same, it makes it easier to deal with if you've got the camera footage there that can make the investigation a whole lot shorter than it currently is.”

There was no difference in survey findings of self-reported behaviour and perceptions of the public's behaviour between officers with BWV and those without, which suggests that officers did not feel a difference from BWV or the difference was too small to alter survey responses about their interactions with the public. However, in interview officers reported mixed experiences about how the public communicate when BWV is present, with interactions appearing to be dependent upon the individual and the situation. Whilst a few officers during interview indicated BWV did not change their behaviour, others believed it impacted on their interactions with the public.

No difference was found for officer survey responses in relation to: procedurally just policing⁴²; use of force; compliance with protocols; or an officer's belief that behaviour below expectations would be challenged.

“I suppose it reinforces that you've got to give all your grounds and your interactions nicer, maybe, at the right times. It makes you do it more textbook like, I suppose.”

“I think it just makes you think for that split second longer about what you're going to do and what you're going to say first...”

⁴² Procedural justice relates to the public's perception of fair decision making and respectful treatment by the police.

Findings Summary: Complaints

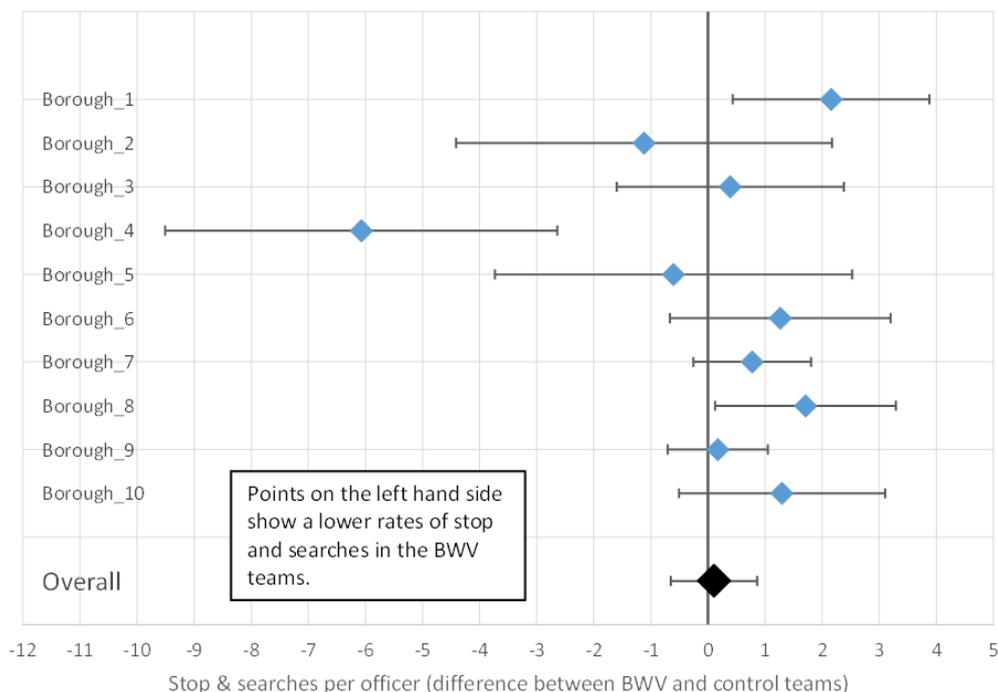
BWV can reduce the number of allegations against officers, particularly of oppressive behaviour. Complaints related to interactions with the public also reduced and, although it did not reach statistical significance, the trend in overall complaints was consistent with these findings. Whilst officer surveys did not indicate a change in the quality and nature of interactions between officers and the public, during interview officers report particular instances where BWV has changed behaviour. Officers also gave examples of using BWV recording to achieve early resolution of potential complaints with little grounds, preventing them from becoming formally progressed, findings which are supported through the officer survey, as BWV officers felt greater protection from complaints⁴³.

Impact on stop and search

It was hypothesised that BWV cameras would reduce response officers' use of stop and search. The MPS stops database recorded approximately 11,300 stops as being carried out in the ten boroughs during the course of the trial. This is an overall average of 5.54 stops per officer (5.62 BWV group, and 5.50 in the control).

There was some variation in the volume of stop and search across the boroughs, perhaps reflecting the local mix of crime, hotspots, or local policies. The lowest borough-wide stop rate for ERTs was 2.2 per officer, while the highest was 13.4. Figure 5 shows the difference between the average number of stop and searches for officers in the control and BWV teams across boroughs⁴⁴. With three boroughs, their BWV teams had a lower rate of stops than their control teams with one of these being statistically significant. Combining results from all ten boroughs indicates there is no significant difference.

Figure 5: Difference between the average number of stops per officer in the control and treatment teams in each borough



It might be that BWV affects boroughs in different ways depending on their stop and search activity, as the only borough with a statistically significant reduction had over twice the rate of stops prior to

⁴³ See Annex B for statements combined to create this factor

⁴⁴ Descriptive statistics, and basic statistical tests, do not compensate for any "inherent" complaints rates in the boroughs ('clustering effects'), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data.

the trial than the next highest trial borough⁴⁵. When completing multivariate statistical modelling to rule out other explanatory factors⁴⁶, which includes the influence of individual borough, there was no evidence that BWV resulted in a reduction in the overall number of stop and searches carried out by each officer⁴⁷.

Understanding the results

Other Stop and Search analysis

BWV and non-BWV wearing ERT teams were also compared over a variety of measures of stop and search: the proportion of stops of people recorded as being from a BME group; and the type of stop conducted.

Although there were some small variations between the treatment and control groups these were not statistically significant when the effects of the clustering were taken into consideration.

The finding that BWV does not decrease the rate of stop and search is supported through the officer surveys, with no difference in officers' self-reported behaviour in relation to discretion or compliance with procedures. In addition there was no reported difference in behaviours linked to procedural justice, which included variables directly related to stop and search procedures (see Annex B). However, arrests as a result of a search are slightly less likely when officers are in a BWV team, indicating a potential difference in decision making⁴⁸. Officer interviews revealed mixed views, with some reporting no change to their approach and other officers giving examples of change.

"... you're dealing with the situation that's in front of you ... I don't think it changes the decision, it changes the execution of how you do it... ...so I'm still going to stop... but how I go about the stop is going to change."

"I think you do take a second to think 'well why am I potentially gonna stop this person?' and you think in your head 'right, I'm gonna search them for this'..... and sometimes you think 'oh actually maybe there's probably not enough [grounds]..."

Officers with BWV were less likely than those without BWV to agree they needed stronger justification for their actions⁴⁹. This finding may explain, to some extent, why BWV has not resulted in a reduction of searches or a change in the quality or nature of the search; BWV, rather than affecting officer decisions to make a stop, may enable officers to feel more confident if challenged. Analysis of interviews suggests officers feel BWV footage can provide support for their justification to search which they did not have previously.

"...it also backs my justification for searching them so it's got evidence again for me doing what I'm doing so I know that again if he complains or that person complains people can understand you know, why our actions are justified."

The need for stronger justification links to the feeling of protection from complaints discussed in the previous section – as officers feel they can support the action they have taken. However using BWV as supporting evidence led more than half (11 of 19) of the officers during interview to be concerned BWV would result in an erosion of the value of officer word, feeling that written statements alone would no longer suffice as acceptable evidence.

⁴⁵ Bromley: 56 searches per 100 officers; Barnet: 22 searches per 100 officers.

⁴⁶ Gender, ethnicity, number of months in the trial, officer age, team and borough.

⁴⁷ Hierarchical generalised linear model with a Poisson link function and teams nested in boroughs. $\beta=0.12$, $p=0.21$.

⁴⁸ Hierarchical generalised linear model with a binomial link function and teams nested in boroughs. $B=-0.17$, $p=0.048$

⁴⁹ See Annex B for statements combined to create this factor

Findings Summary: Stop and Search

There was no overall impact of BWV on the number or type of stop and searches conducted. In addition, there were no differences in officers' self-reported behaviour relating to how they conducted stops, but arrests as a result of a search are slightly less likely when officers are in a BWV team. Officer surveys showed no difference in discretion; compliance with procedures; and self-reported behaviour in relation to procedural justice during a search. However, officers with BWV were less likely than those without BWV to agree they needed stronger justification for their actions. This may explain to some extent why BWV has not resulted in a reduction of stop and searches, or changed their quality or nature. Rather than affecting officer decision making, BWV may enable officers to feel more confident if challenged. Analysis of interviews suggests officers feel BWV footage can provide support for their justification to search which they did not have previously.

Impact on criminal justice outcomes

It was hypothesised that BWV cameras would increase the proportion of violent incidents attended by response officers that resulted in a criminal justice outcome. Use of BWV at incidents of violence potentially offers evidence of injuries, the scene, and heightened emotional responses of suspects, victims or witnesses which could otherwise affect the assessment of evidential thresholds. Approximately 148,000 crime reports were extracted from the MPS CRIS (Crime Reporting Incident System) between 1st May 2014 and 30th April 2015⁵⁰. From this, a total of 64,355 (44%) were identified as viable for analysis (see Annex D). Data was analysed as cases progressed through different stages of the CJ process, with the main milestones being:

- 1) **Where at least one suspect was arrested; and**
- 2) **Where at least one suspect was charged/received a summons.**

From the 64,355 case included for analysis:

- Just under 50% (n=31,682) had at least one suspect;
- Of these 68% (n=21,604) had recorded at least one arrest;
- Of the cases with at least one arrest, 59% (n=12,717) featured a judicial outcome⁵¹; and
- The majority of these judicial outcomes were a charge/summons (n=8,849, 70%).

The officer⁵² who reported the case determined whether it was allocated to treatment or control conditions⁵³.

Arrests

There was some variation in the difference between the treatment and control group rates of arrests across the boroughs⁵⁴. Figure 6 shows the variation across boroughs⁵⁵ with three boroughs displaying

⁵⁰ Data downloaded on 08/06/2015 – any CJ outcomes up until this date included in analysis.

⁵¹ Judicial outcomes include: Charge/Summons, Cautioned, Warning or other outcome (e.g. Community Resolution, Cannabis Warning, Penalty Notice) from the police

⁵² To note, this officer may not have made an arrest, but will most likely be the first contact point with the case and therefore most likely to use BWV for evidential purposes.

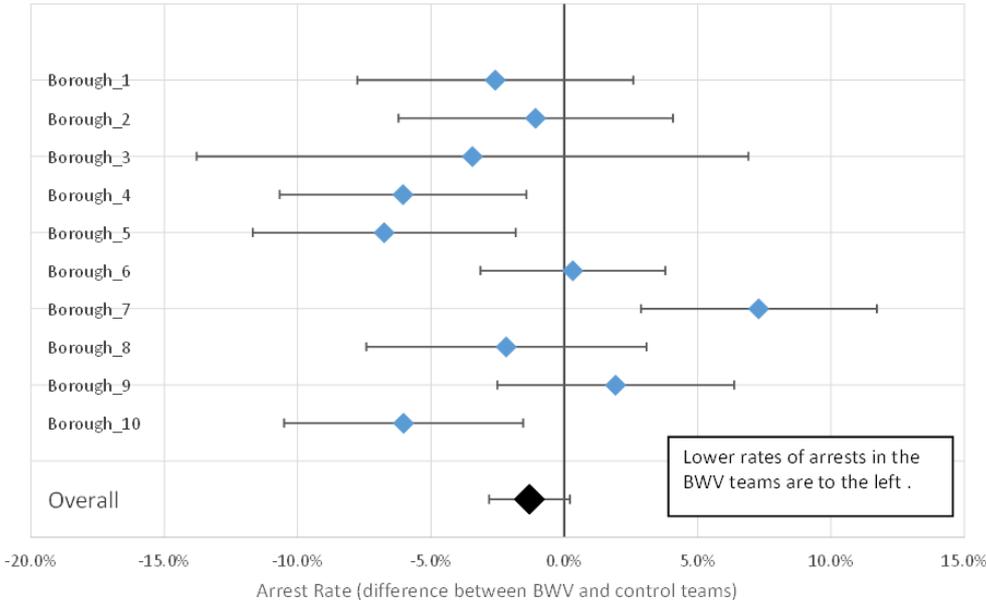
⁵³ To increase the likelihood of detecting impact, it was decided to focus on violent incidents where it was felt BWV was more likely to capture more and better quality evidence. For our analysis, violent incidents were defined as: Serious wounding; Assault with Injury; Common Assault; Attempted murder; Assault on a constable; Affray; and Violent disorder.

⁵⁴ Descriptive statistics, and basic statistical tests, do not compensate for any “inherent” complaints rates in the boroughs (‘clustering effects’), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data. Results from more comprehensive statistical modelling are shown below, and these provide the strongest analysis of the data.

⁵⁵ Descriptive statistics, and basic statistical tests, do not compensate for any “inherent” complaints rates in the boroughs (‘clustering effects’), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data.

their BWV teams had a higher rate of average number of arrests than their control teams and only one of these being statistically significant. Combining results from all ten boroughs indicates there is no significant difference⁵⁶. A more robust multivariate statistical modelling was performed to rule out other explanatory factors⁵⁷, and to compensate for the effect of the clustering in the data. This modelling confirmed there was no evidence that BWV increased the rate of arrest for violent incidents⁵⁸.

Figure 6: Difference in the proportion of crimes with an arrest at any time, between the treatment and control teams in each borough

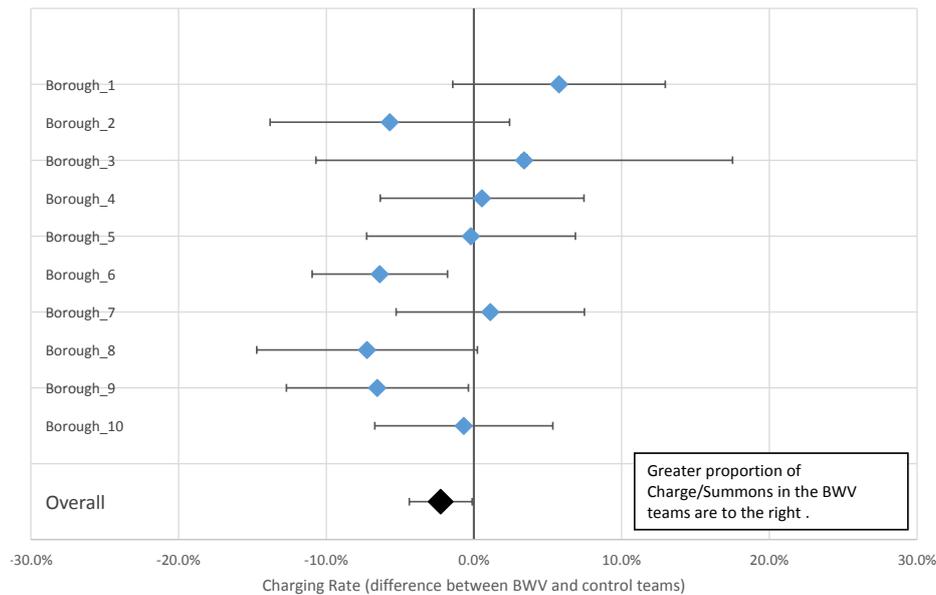


Charge/Summons following arrest

There was variation in the difference between the treatment and control group rates of charge across the boroughs⁵⁹. Figure 7 shows the variation across boroughs⁶⁰ with five boroughs displaying their BWV teams had a lower rate of average number of charges than their control teams and two of these being statistically significant. Combining results from all ten boroughs indicates there is a small difference⁶¹, with the cases where the reporting officer is in a team BWV less likely to result in at least one charge. This result was confirmed by a more robust multivariate statistical modelling⁶², which was performed to rule out other explanatory factors⁶³. However, with very large sample sizes, small differences can be statistically significant and so the real impact should be treated with caution⁶⁴. Without further exploration of later CJ outcomes at court it is also not known if a lower proportion of charges is a result of BWV leading to preparation of fewer, but stronger cases.

⁵⁶ $\chi^2 (1, N = 13,635) = 2.855, p = .091. Phi = 0.014$
⁵⁷ Borough, crime types, DA incidents, VR flags, number of suspects, number of victims, previous convictions, victim-suspect relationships.
⁵⁸ Hierarchical generalised linear model with a binary link function and teams nested in boroughs. $\beta=-0.08, p=0.25, (n=13,655)$
⁵⁹ Descriptive statistics, and basic statistical tests, do not compensate for any “inherent” complaints rates in the boroughs (‘clustering effects’), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data. Results from more comprehensive statistical modelling are shown below, and these provide the strongest analysis of the data.
⁶⁰ Descriptive statistics, and basic statistical tests, do not compensate for any “inherent” complaints rates in the boroughs (‘clustering effects’), the time an officer spent in the BWV or control groups, or other demographic factors. Nevertheless, they are useful for understanding and describing the data.
⁶¹ $\chi^2 (1, N = 8222) = 4.229, p = .040. Phi = -0.023$
⁶² Hierarchical generalised linear model with a binomial link function, and teams nested in boroughs. $\beta=-0.097, p=0.048, (n= 8,222)$
⁶³ Borough, team, crime types, DA incidents, VR flags, number of suspects, number of victims, previous convictions, victim-suspect relationships.
⁶⁴ Whilst the Borough 4 received additional resources from the MPS as it had a digital court; this appeared to have no effect on the charging outcomes, with no real difference seen between the control and treatment groups, seen in the basic analysis.

Figure 7: Difference in the proportion of crimes with charge/summons, between the treatment and control teams in each borough



A range of other analysis was undertaken to further understand these results. To begin, the use of BWV in cases was explored, using the 'VR flag' (signifying when an officer has flagged video evidence)⁶⁵. It was found that 28% of violent crimes in the treatment team had a VR flag compared to 0.2% in the control team, showing an increase in amount of available digital evidence for cases from BWV. In the original multivariate statistical modelling for arrest, which took into account other strong explanatory factors (such as number of suspects and victims, or the type of crime), the variable 'VR flag' had a significant positive relationship with arrest⁶⁶. In other words, crimes where officers had flagged BWV evidence have an increased likelihood of an arrest.

Subsequent analysis isolated the effects of footage. All cases reported by non-BWV officers were compared to *only* cases where video footage was specifically flagged as included by BWV officers. This was used to explore the effect of the presence of the BWV evidence itself on the decision to arrest and charge. This analysis supported the model, indicating a significant relationship with arrest⁶⁷.

This finding could indicate officers are using cameras during arrest to strengthen existing evidence, or be a result of a different type of situation where video recording occurs, in which BWV is more likely to be used to collect evidence. It may be that more serious incidents or more motivated officers explain the increased arrest rate. However this positive relationship between BWV evidence and CJ outcomes was not seen for charges or summons – suggesting any bias in recorded incidents is not a factor. As other possibilities not controlled for in our analysis cannot be ruled out, this needs further investigation to ensure the difference is a result of BWV.

Other Criminal Justice Milestones

BWV and non-BWV wearing ERT teams were also compared over a variety of secondary CJ milestones: whether or not at least one suspect was identified; whether or not at least one arrest at the scene occurred and whether there was any Judicial Outcome. No significant difference was found across all the above additional outcomes.

⁶⁵ In the majority of cases this will relate to BWV, but could signify the use of CCTV.

⁶⁶ $b = .589$ $p = <.000$ ($N=13,655$)

⁶⁷ $\chi^2 (1, N = 9832) = 129.481, p = <.000. \Phi = 0.115.$

There is evidence from officer interviews and surveys, as well as management information from the BWV central team to suggest the lack of impact in the level of charges/summons may be due to barriers earlier in the CJ process, both internally with secondary investigators and with external partners such as the CPS not routinely using BWV evidence. This blockage in the flow of evidence has been frequently reported in officer surveys and perhaps exacerbated by low officer usage, meaning secondary investigators and the CPS reportedly never became proficient in the use of footage.

“CPS do not know how to view the footage... they need to be shown how to use [the cloud based evidence repository]”

Monthly compliance and audit checks by the BWV central team support this lack of use throughout the CJ process; however the data collection was not systematic, so can only be used as indicative evidence as it may not be representative of all cases.

Understanding the results

Although there is no increase in arrest or charge as a result of BWV, officer surveys indicate that as teams became more acquainted with the technology, treatment officers were significantly more likely

Case Study 2: Evidence led prosecutions

Officers responded to a domestic incident where a suspect had punched his partner in the face and struck her several times with a frying pan in front of her children. Initially the victim provided a statement, however this was withdrawn.

As a result of evidence captured on BWV, the suspect was arrested and interviewed and the case was put before CPS who authorised a charge.

than control officers to report being confident they were capturing good quality evidence⁶⁸. On the whole, interviewed officers appreciated the evidential value of using BWV at incidents, specifically in relation to Domestic Abuse (DA). When asked to show interviewers footage that sums up their experience of using BWV, over half brought in video clips demonstrating their ability to capture key pieces of evidence - many from DA incidents. Specifically, the ability to accurately present evidence rather than depending solely on memory was felt to be a key benefit, as well as revealing a level of detail and emotion not possible to capture in written statements.

“...you can be as eloquent as you can with your statement it still, it’s still very powerful to see that person stood there tears streaming down their

eyes, you know covered in blood or whatever T-shirt torn, you know children screaming, you can put that in a statement but it’s still very powerful to see it, you know in the live film.”

Even as a key mandatory recording situation DA flagged incidents (n=10,006) did not see any significant difference between the control and treatment groups in arrest or charge. This may be a reflection of the existing drive for positive action at DA incidents by the MPS. It may be that impacts will be felt further down the CJ process, through outcomes in court, no data was available at this time for analysis. Future papers plan to explore impact on early guilty pleas and sentencing decisions as a result of BWV for all crime types.

⁶⁸ U = 32932.0, P < 0.00, r = 0.17: Treatment: Mdn = 5.50, Control: Mdn = 5.00) to feel they collect quality evidence at the scene. In the third survey treatment officers also disagreed significantly more than control officers with statement “The evidence I gather doesn’t convey what it’s really like at the scene” Treatment Mdn =XX, Control Mdn XX, U = 35131, P = 0.002 r = -0.13. These findings were not observed in surveys earlier in the trial.

Findings Summary: Criminal Justice Outcomes

BWV did not affect the proportion of **arrests** for violent crime. When an arrest had occurred, there was a slightly lower proportion of **charges** for incidents reported by officers in a BWV team, is not known if BWV leads to the preparation of fewer, but stronger cases without further exploration of later CJ outcomes at court. Subsequent analysis isolating the effects in cases where BWV officers specifically flagged a case with footage showed a higher arrest rate than cases reported by officers not in a BWV team, but no difference to the charge rate. This could indicate officers are using cameras during arrest to strengthen existing evidence, or officers chose particular types of situation to flag BWV evidence.

Although the statistical analysis suggests BWV has had a limited impact, officer surveys indicate a belief that BWV helps to collect better quality of evidence. However, there appears to be a blockage preventing BWV evidence being used in later stages of the CJ process. Exploring only incidents of Domestic Abuse (DA) (a mandatory recording situation), analysis found BWV does not affect the decision to arrest or charge. This may be a reflection of the existing drive for positive action at DA incidents by the MPS. Nevertheless officer interviews indicated BWV can provide evidential value particularly during incidents of DA, to show a level of detail/emotion not possible in written statements, an impact which may be seen later in the CJ process (for example at court), but has not been possible to capture during the current trial.

Secondary Outcome Analysis

The research explored a number of other areas where BWV may have an impact, specifically: police/public interaction, innovative use, and implementation learning.

Public Attitude

The Public Attitude Survey (PAS)^{xxii} found London residents are generally supportive of BWV, agreeing positively with the below statements, perceiving BWV:

- will make officers more accountable for their actions (92%, n=11,756);
- reassure them the police will do the right thing (87%, n=11,035);
- will make officers treat people fairly (87%, n=11,127);
- will ensure officers act within the law (90%, n=11,460); and
- will ensure officers follow correct procedures (90%, n=11,496).

These statements link to the concept of procedural justice⁶⁹ and whilst the direction of influence cannot be implied, across boroughs where the public had a higher level of awareness of BWV they were also more likely to agree with the statements. In addition, agreement with these statements was significantly linked to confidence in the police.

These findings demonstrate potential benefits of the public awareness of BWV. MPS external communication, consultation and transparency should therefore be at the forefront of the wider roll out of BWV to raise awareness. During the trial, the majority of PAS respondents (51%, n=6,483) were not actually aware MPS officers wore BWVs. Of those who were aware (6,435) it appears the majority (69%, 4,416) resided in the non-trial boroughs. This may be a reflection of the historical pockets of BWV use; that residents encountered BWV outside of their home borough; or something about the boroughs selected to take part in the trial being different to the other boroughs (higher stop and search and compliant rates), or may not even be borough related, as most of the respondents awareness of BWV came from the media rather than direct contact. Of the respondents who were aware of BWV, the majority (84%, n=5,437) had heard about it from the media. Only 13% (n=806) had seen an officer wearing a camera and 5% (n=255) had contact with an officer wearing BWV. There is no difference

⁶⁹ Procedural justice relates to the public's perception of fair decision making and respectful treatment by the police.

between levels of confidence (police are doing a good job in this area) whether respondents were aware of BWV or not.

As reflected in the officer survey, PAS respondents saw the potential evidential benefits of BWV, with 95% (n=12,193) believing they will help the police to gather evidence. They did not think BWV would negatively impact on police-public relations; disagreeing that BWV would invade people's privacy (62%, n=8,155); or make the police less approachable (61%, n=7,883) and agreeing they would stop people making false allegations against officers (89%, n=11,345). However, as only 5% of PAS respondents had contact with an officer wearing BWV, the general acceptance of BWV may therefore not reflect those members of the public who have had direct contact with the police. A number of officers reported in the final survey being asked to turn their camera off at least once by: individuals being stopped and searched (20%, n=66); suspects (34%, n=120); victims (36%, n=126); the general public (17%, n=61); non-BWV fellow officers (12%, n=62); and by senior supervisors (5%, n=19), highlighting contact may affect acceptance⁷⁰.

Case Study 3: Capturing victim impact

Officers made use of BWV when responding to a domestic incident where a suspect's parents had refused to give him money to buy heroin. The suspect smashed a T.V., a laptop and pushed family members before threatening them with a screwdriver. Officer's BWV captured first hand the threatening demeanour of the suspect and emotional anguish the parents were suffering. The suspect was later charged and was remanded in custody.

Dealing with victims

It was hypothesised BWV may increase the chance of a case having a CJ outcome, in part because of the increase in cooperation of victims and witnesses to proceed with a case and, in parallel, the ability to proceed without a victims involvement. From all 64,355 cases included in analysis 60,368 had at least one victim. Analysis compared cases from the treatment and control teams on the suspect elimination reasons of 'Victim Unwilling to Prosecute', 'Insufficient Evidence to Proceed', as proxies for victim cooperation and the ability to proceed with a case, found no significant difference was between the groups. Therefore, there was no evidence of an impact on victim involvement from BWV at this stage, perhaps related to the block in the flow of evidence in the CJ process discussed in the section above.

The MPS trial attempted to further explore BWV use, assessing the impact on victim satisfaction with the police. Although no difference has been found when analysing the User Satisfaction Survey (USS) using multivariate logistic modelling, it may be there has not been enough time for BWV to embed to see stronger benefits in victim experience, this is therefore another area which should be assessed on full roll out. There were indications from exploratory analysis that there could have been differences in satisfaction which, although they not sustained after more robust modelling, may be worth further exploration: the presence of BWV and one of the drivers of satisfaction (police action at the scene)⁷¹; satisfaction with the initial police action⁷²; and overall experience⁷³ for victims of Racially Motivated Crime.

Officer Safety

To understand more about officer safety and to further explore findings from officer surveys regarding self-reported and public behaviour, data from officer injury and assaults were analysed.

Case Study 4: Officer Protection

An officer reported:
"We stopped a moped in a back alleyway by a local drug dealer probably within seconds surrounded by about 15, 20 youths all quite hostile, just two of us..... within about seconds they all realised they were on camera and it was like the effect of having an extra 10 PCs here. Everybody realised I'm on camera, I better watch what I say here, I could get arrested either now or at a later date and its effect was really quite impressive."

⁷⁰ Each question has varying responses rates.

⁷¹ $\chi^2 (1, N = 4,002) = 6.832, p = .042$

⁷² $f = .151, p < .05$. Phi-Coefficient; $\chi^2 (1, N = 371) = 8.493, p = .004$

⁷³ $f = .118, p < .05$. Phi-Coefficient; $\chi^2 (1, N = 371) = 5.207, p = .022$

Incidents in which an officer was a victim of a violent assault were analysed (n=499), of particular interest as this crime type is the most likely to be recorded on BWV. There was no significant difference between officers wearing BWV or not in their levels of assault. This mirrors the results for arrests for all violent crime where no difference was seen.

Conflict was further explored by analysing officer injuries data. Chi squared tests shown the proportion of officers that had incurred an injury whilst arresting or restraining a member of the public were no different between treatment and control officers. Taken together, the assault and injuries data suggests an officer is no less likely to be assaulted if wearing a BWV.

As mentioned previously, officer surveys found no difference in the self-reported frequency of use of force between the two groups. The lack of impact on use of force was further evidenced in interviews, where officers emphasised their decision to use force tended to be made as an immediate responses to a situation, so BWV had no impact upon this.

“No not using force ‘cause when you need to use force, you just have to do it. I’m not really one to use force without needing to do it, so the camera wouldn’t change that.”

“that’s pretty much instantaneous. Once you think you need to use force, you use force. No [BWV] doesn’t affect me in any way.”

These results combined appear to suggest BWV had no impact upon the likelihood of physical conflict with suspects during this trial. This mirrors previous stated findings that BWV does not change decision making or the quality of an interaction, but does provide officers with more confidence (Case study 4) and justification for their actions.

Innovative Use

Throughout the trial officers have highlighted how BWV has been used outside of mandated situations to secure additional benefits. These have included, but not been limited to: capturing the behaviour of individuals in mental health crisis to subsequently inform NHS partners (i.e. to demonstrate need and secure a place of

safety); innovative evidence gathering at crime scenes and premise searches; providing quick time evidence to partners (e.g. the coroner); and using footage as an intelligence source for other policing purposes (Case study 5).

Case Study 6: Learning Lessons

Officers reported watching footage, during a team briefing session, from a Taser incident where lessons about improved practice could be learned. The incident had been captured on BWV and footage shared with the team, to talk through how they could have handled the situation differently.

Furthermore, officers describe using footage for their own professional development - both individually and as part of a team - highlighting the potential to use BWV as an aid for learning, by reviewing footage to provide practical examples of good practice (Case study 6).

The MPS have recognised the opportunities that the recording of encounters, particularly in respect of stop and search, can bring in order to demonstrate accountability of routine policing actions to the public. In 2014 the MPS Central BWV team pioneered the first independent scrutiny of stop and search footage by allowing vetted members of Borough community monitoring groups to randomly select stop and search footage for review; providing immediate feedback on encounters to Borough Commanders.

Case Study 5: Police Intelligence

A BWV equipped team responded to a victim of a stabbing. Officers uploaded the footage, accurately recording the location field. It later transpired the victim and his friends were of interest to Trident, all linked to serious gang related activity including drug dealing.

Due to BWV footage with accurate location details, Trident officers obtained gang association intelligence and were able to use high quality imagery from the footage to assist their on-going operation.

5. Conclusions and Implications

This trial was an opportunity for a large urban police service - the MPS - to test the impact of implementing BWV using a robust methodology. As the results are not entirely consistent with the size and scale of previous findings (see Setting the Scene) the dangers of making policy decisions, practice or recommendations from weak or non-existent evidence are highlighted. For example, a non-experimental design would have suggested BWV had a positive impact in reducing the prevalence of stop and search, as the trial boroughs saw a 49% reduction compared to the previous year. Use of comparison groups and the RCT design was able to demonstrate that this reduction occurred in the absence of BWV also, ensuring positive impacts have not incorrectly been attributed to BWV. However, to ensure this methodology was robust and implemented correctly took a proactive collaborative approach by MOPAC, the College of Policing and the MPS – as this was a complex multi-site cluster randomised controlled trial, with many lessons learned throughout.

Findings from the trial challenge previous assumptions about the impact of BWV, especially on police-public interaction and increased accountability for stop and search. The trial has demonstrated no change in the number or nature of searches and there is little supporting evidence about the quality of the interaction improving. This suggests a gap between the high expectations around BWV and the actual impact it has in relation to stop and search and officer behaviour change. However, BWV can still provide transparent evidence about whether stops were warranted and whether the outcome of such stops (e.g. the discovery of lethal weapons for instance) was achieved. In addition, officers themselves welcomed the transparency BWV provides with respect to their decision making.

This trial found evidence for a reduction in complaints and that BWV does reduce the number of allegations an officer receives, particularly for oppressive behaviour. Whilst there are strong case studies where BWV has deescalated situations, the more modest impact on complaints observed in our study suggests that positive interactions may already be occurring, making the number of confrontational situations which BWV might influence, relatively rare and impact difficult to detect. A common challenge to BWV as tool for behaviour change is that officers can choose to switch the camera off when they would not like their behaviour recorded. However, there is no evidence of this occurring and the team based allocation would mean these officers would require other BWV officers present to also switch their cameras off.

In addition to improving the quality and nature of police-public interactions, there have been suggestions that BWV would improve the evidential process, increasing criminal justice outcomes. During the length of the trial it has only been possible to test the impact of BWV on arrest and charge rate. The trial found BWV had no impact on these measures, but future research is planned to explore the outcomes in court for convictions and sentencing. The research will also help to understand the facilitators and barriers throughout policing and the wider criminal justice system to the effective use of BWV footage for evidential purposes. Findings from the officer surveys suggest effective use of BWV is not something that is down to the police alone, it needs other partners and all parts of the CJ system to be on board and be ready to use footage, making the most of BWV.

When new recording technology is introduced within policing, such as CCTV and ANPR, there can often be concerns around privacy and accountability. The trial found the balance between the perceived benefits of BWV and concerns about privacy at present lean towards public acceptance for the technology, things may tip the other way if, however, perceived benefits of BWV are not realised. Currently, London residents are supportive of BWV, with their opinions of the technology positively associated with their views of how 'procedurally just' the police are, and their confidence in the MPS. However, public attitudes to BWV should be monitored, to understand if the technology is viewed as increasing transparency, or as an unnecessary intrusion into privacy.

Despite the limited impact demonstrated in the trial, there is still an argument BWV is a key tool to increase police transparency. In order for transparency to be maximised, BWV footage needs to be accessible, and decisions regarding video access, dissemination; and review will need to be made. Forces will need to consider *how* transparent they want to be, and this will be critical in preparation for high profile incidents where BWV is available. Routinely sharing footage may not be desirable, and is currently prohibitive due to expense, and the lack of automated redaction software^{xxiii}. However, further research is needed to explore the impact of increased public exposure to BWV footage.

Lessons learned from the implementation of this trial, shows that any force considering rolling out BWV needs to consider the practical challenges. These challenges include, timely training, support for technical issues, monitoring compliance with recording and back office policies and internal and external cultural change. Further research is required to understand if the impacts seen, or not seen, in this trial hold for officers in other roles, boroughs in the MPS and other force areas.

Finally, this trial has found a number of very positive and innovative uses of BWV that were not being directly tested, but that officers have been sharing with each other. Officers reported a range of innovative uses of BWV, including professional development for officers individually and organisationally (sharing good practice and training); use of intelligence; and sharing information with partners (e.g. mental health organisations, social services) and the public. There were also benefits for evidence gathering and searching.

Future Research

In addition to the research gaps mentioned above, it has not been possible to capture an understanding of a number of related areas including:

- Impact on officers who have no policing experience before BWV - new police joiners, who have never known a different way, may become more public-interaction focused and more reflective about their behaviour.
- Wider impact on the Criminal Justice System - evidence led prosecutions and sentencing.
- Lessons learnt from assessing footage of police interactions, how this can be used in training environments to assist professional development.
- Time savings or increased efficiency as a result of BWV.
- The cost-benefits across the entire CJ process.
- If BWV can be used during community resolutions – particularly the ability to view footage during complaint resolution and its impact on both parties.
- The other innovative uses highlighted across this report e.g. other crime types and incidents involving mental health needs.

Annexes

Annex A: Methodology

The intervention for treatment officers included 1) training officers to use BWV, 2) allocating personal issue BWV and 3) on-going supervision and guidance on use of BWV.

1) The training

The MPS were responsible for providing the cameras, and for preparing the policy and training material. The training given to officers covered the following:

- aims of the trial;
- process for operational use, such as when to switch the camera on and off and the notification to give to the public when using the cameras;
- statement taking process and disclosure considerations;
- practical use of the cameras themselves; and
- uploading, retention, storage issues and the back office process for providing footage to CPS.

2) The cameras

The BWV cameras were attached to the outer vest of the officers, at shoulder/chest height (one borough, Borough 3, had some officers who wore a headcam which could be worn on the head or shoulder). Cameras had fixed lenses, capable of capturing 125 degrees horizontally and 70 degrees vertically. The cameras had a 30 second video only pre-buffer, so that when an officer presses the record button, the camera captures the previous 30 seconds of visual (not audio) information. The cameras had fixed non removable memory – docking the camera charged it and uploaded the footage to a cloud storage facility, clearing the camera ready for the next deployment. Footage would be manually labelled by the officer indicating the type of incident, whether the footage should be retained for evidential purposes and then linked to a case/crime. CPS and secondary investigators had access to the cloud and could view the footage when necessary. All footage unless marked as evidential would be automatically deleted after 31 days.

3) On-going supervision and guidance

All response officers assigned a BWV camera were required to wear it whilst on duty, switching it on as prescribed by force policy^{xxiv}, i.e. as soon as practicable for all stop and search encounters, domestic abuse incidents, use of force incidents and other mandatory situations⁷⁴, as well as for evidential purposes. All other use was discretionary. If an officer agreed to wear a camera their use was monitored for compliance with MPS policy by the MPS BWV team, who provided regular feedback to boroughs during the trial – as well as creating amended policies and supporting documents as aide memoirs for officers to address common challenges. The MPS BWV team also collated good news stories and lessons learned which were disseminated in a monthly BWV news email. The team ran monthly meetings for single points of contact from each of the ten boroughs to receive updates/support on common issues and feedback – this included discussing barriers to compliance and technical support. In addition there were bi-monthly project management meetings where senior representatives from relevant areas of the MPS met and discussed the evaluation and related issues.

The MPS BWV team gave on-going training support and trained trainers for each borough, so they could prepare new members of the response team who joined during the life of the trial and beyond. In addition, the MPS BWV team ran training for secondary investigators to ensure they were comfortable accessing and using BWV footage. The training support was in reaction to a lack of usage

⁷⁴ Mandatory situations were, motor vehicle stops, premises searches, arrest enquiries, stop and account/search, statutory directions, use of force, critical incidents and domestic abuse incidents

identified by the BWV central team (see design limitations). One of the boroughs, Borough 4, had a digital magistrate's court, so special support was given to take advantage of the Wi-Fi enabled Clickshare process – a new system which allows streaming of evidence into courtrooms and digital sharing of case files with CPS/Defence/Court users. The MPS dedicated a member of staff to work with the CPS (for all ten boroughs) and the digital court to maximise the benefits of digital working across criminal justice agencies.

Methodology – trial design

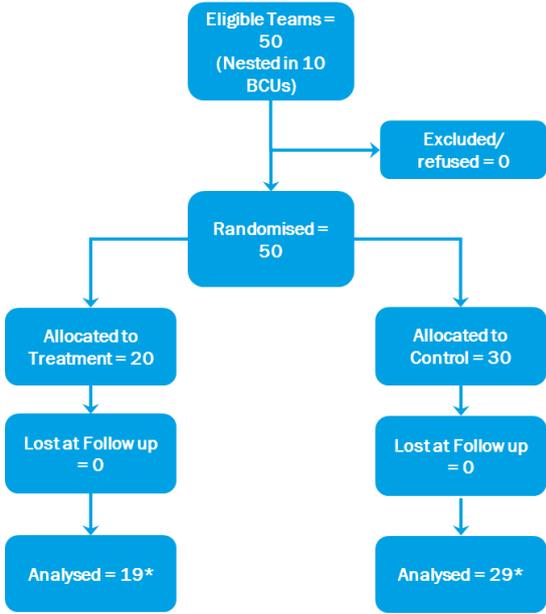
When a camera assigned officer permanently left an ERT (e.g. to change roles or move to restricted duties), they returned their camera to the borough to be reallocated to the new officer replacing them. New officers were allocated to response teams by local posting panels based on corporate need (e.g. team strength/skill). The posting process was the same for the control and treatment teams and there were no records of BWV being mentioned in any posting process.

One of the main threats to an RCT design is contamination; where the control group do not remain completely 'clean' of the treatment and so no longer provide a good comparison of business as usual. In this instance there was a risk of officers with and without cameras attending the same incidents, so although only one officer is wearing the camera, both officers at the incident are affected by its presence. Contamination can also work at different times with the same officer. In the Rialto study^{xxv} shifts were randomly allocated for officers to either wear BWV or not, however reductions in complaints and use of force happened during both treatment and control shifts – suggesting officer's behaviour was modified during the times they were wearing the camera and that carried over to when they were not. For this reason when officers changed ERTs, moving from treatment to control conditions, their time in the control condition was excluded. If moving from control to treatment, both periods were included. To balance a design which gives the greatest chance of detecting (statistically) a real difference and reducing the likelihood of contamination, team based allocation was chosen ahead of shift based or individual allocation because:

1. The outcomes of interest are linked to officer behaviour, and so vulnerable to contamination effects. If whole teams of officers wear the cameras then they should only be attending incidents with other officers in the same conditions most of the time. As the shifts rotate different teams will be policing the same area and community, just at different points in the day. While there may be a small period of time at the beginning and end of a shift when treatment and control teams will both be on duty (for hand over, etc.) one will usually be back at the station being briefed or writing up notes from the incidents attended during that shift.
2. In previous studies^{xxvi} usage compliance (ensuring officers wear and use the camera in line with force policy) has been an issue. It was hoped team based allocation would increase compliance for two reasons. First it more accurately replicates 'real world' conditions as peers are all wearing the equipment, learning and sharing experiences. Hesitant officers would be unable to avoid BWV entirely as they would attend incidents with colleagues who are recording. Second, it supports enforcement of compliance as supervisors know everyone on their team should be wearing BWV and are able to encourage usage. In addition, messages from the central team about usage, good practice, and policy/guidance could be easier disseminated to an entire team by feeding into briefings. Team-based allocation was seen operationally as the most feasible design, which would ease the administrative burden of running the trial⁷⁵.

75 The practicalities of alternative implementation could have been a barrier, for many reasons including the cost of IT infrastructure; monitoring officers in the trial; and reassignment of cameras to new officers.

Figure 8: Trial CONSORT diagram



*The random allocation of two teams to treatment and control in one borough was not followed therefore these two teams were excluded from all analysis.

Before the final decision to allocate the intervention based on teams rather than shifts or officers was made, analysis was undertaken to examine how ERT teams across the ten boroughs compared on our three key outcome measures. The analysis found bigger differences in ERT outcomes *between* boroughs than *within* borough. Overall, this suggested that a design where teams in each borough could be compared would help to isolate the impact of the introduction of BWV on our key outcome measures. Whilst the teams are broadly equivalent allowing strong statements about impact to be made for the boroughs, the generalisability of results are limited, as the selection of the ten boroughs was designed to maximise the likelihood of detecting a difference. Therefore the results from this trial may not be directly translated into other boroughs in the MPS, which may vary in important ways to those chosen to be part of the trial. Figure 8 explains the inclusion, allocation, follow-up and analysis stages.

After teams had been allocated to treatment and control groups, further analysis was undertaken to compare key demographic information. The random assignment appeared to have been successful as comparisons of key demographic information (proportion of females, BME and age ranges⁷⁶) show the treatment and control groups to be broadly equivalent before the introduction of BWV cameras, which allows more confidence that comparison between the two groups would be fair^{xxvii}. Thus any difference after can be directly attributed to the intervention. One possible explanation of any identified effects of BWV is that they are the product of officers knowing they are taking part in an experiment. Officers may be aware that the organisation is interested in the impact of BWV on CJ outcomes, reducing complaints, stop and search activity and that their activity will be monitored, so alter their behaviour as a result. Officers may also perceive an expectation that they (and colleagues) will perform better if they wear cameras. If this were the case, then this expectation in itself could potentially drive performance improvement.

While the aim was for all officers in the treatment teams to receive the intervention (BWV), in practice, not all ended up being sent on training and issued with a camera as intended. This was for a variety of reasons (e.g. sickness), but most commonly because there was an underestimate of the number of officers who would need a camera for personal issue (as there were more officers than anticipated – see figure 3, there were 596 in the original allocation) in all ten boroughs⁷⁷. In July 2014 it was clear there was a shortfall of around 180 cameras. To reduce the impact of officers without cameras, the decision was made to distribute remaining cameras to treatment teams across a smaller number of boroughs to enable them to reach an 80% saturation as quickly as possible (so that if no more cameras became available they could be a smaller trial with a greater fidelity to the intervention). To address this potential allocation bias all officers in both groups were included in the analysis.

This saturation management was important as the order in which officers went on training and received cameras was not random, and so an element of bias could have influenced early use and boroughs with a low saturation (e.g. the most motivated officers could have volunteered for training

⁷⁶ Both groups had 26% female officers. Age distribution and number of years in service were very similar too. Ethnicity was very slightly different, with 15% of the officers recorded as BME in the treatment group compared to 11% of the control group.

⁷⁷ Camera were also needed for a range of reasons including for training, to replace those lost or broken, as well as those taken by officers who transferred teams.

first and been the only officers with cameras). This decision in practice had little long term impact, as more cameras were found for the trial and as shown in table 1, the average saturation of camera wearing officers in treatment teams across boroughs is broadly equivalent.

Table 1: Average officer saturation, uploaded clips and evidentially marked clips

Borough	Officers Trained (%)	Officers Uploaded Clip (%)	Officers Uploaded Evidential Clip (%)
BOROUGH 1	62%	55%	44%
BOROUGH 2	82%	77%	66%
BOROUGH 3	69%	55%	41%
BOROUGH 4	77%	70%	63%
BOROUGH 5	79%	70%	55%
BOROUGH 6	92%	83%	68%
BOROUGH 7	88%	80%	67%
BOROUGH 8	94%	86%	61%
BOROUGH 9	87%	78%	53%
BOROUGH 10	92%	82%	66%

Despite some treatment group officers not being trained and/or given cameras, it nevertheless remained important to include them in the analysis – known as intention to treat analysis- (see figure 3 flow of officers). Exclusion could have biased results, as those who did not attend training or were not issued with cameras could have been different to those who did (e.g. in terms of motivation, their attitudes towards BWV or newness to the team). The inclusion of all officers randomly assigned to the treatment group in the analysis – regardless of whether they received the training, a camera, or neither – provides a better ‘real world’ assessment of the impact of the intervention. The same principles apply to

officers who have been issued with a camera but do not follow the usage policy and chose not to record situations. This analytical approach would also seem best as officers attending an incident as part of a treatment team would likely be exposed to aspects of the BWV intervention when colleagues used BWV as instructed. Team dynamics and the presence of cameras at jointly attended incidents could impact on both officers with and without cameras, as well as all others who come into contact with them (e.g. members of the public, suspects, victims). To take account of varying usage rates between officers, statistical modelling undertaken in our analysis included total number of clips, total length of clips and length of time with a camera, for all key outcome measures, and whether a case had an associated video recording for CJ outcomes.

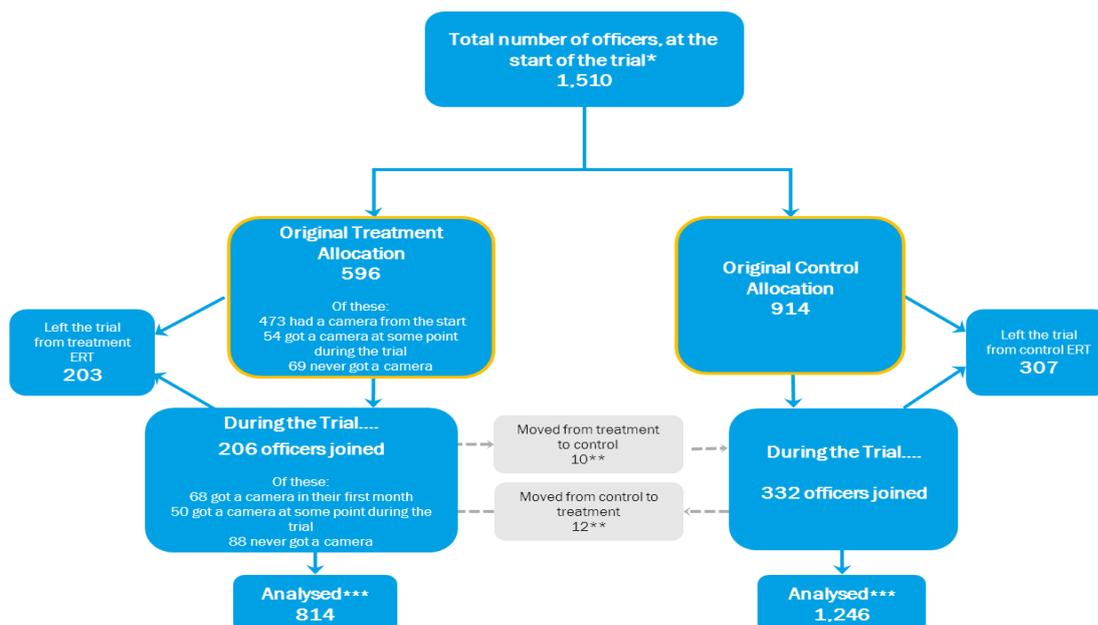
Due to the different start dates for each borough, and the overall shortfall in available cameras, it would not be representative to analyse outcome measures in the months where boroughs had no cameras – as this would effectively compare two groups, both without cameras, and would not be a test of the impact of BWV. To make analysis a fair test of the intervention itself, each borough was given its own trial start date. Boroughs were deemed to go live for evaluation purposes once more than 50% of officers in a treatment team had uploaded an operational clip⁷⁸. On two occasions a borough was deemed live prior to reaching 50% saturation, as the borough saturation level was marginally below 50%, equating to a shortfall of only a few officers⁷⁹.

The decision was based on four factors: having enough usage of the technology to test the true impact of BWV; counteracting any potential bias from boroughs selecting a particular type of officers to receive training/equipment early on; the trial being a ‘real world’ test of BWV; and having enough time for the outcome measures to be detectable.

⁷⁸ Operational refers to any clip uploaded that is not categorised or flagged as for training purposes. In the event that an officer has never categorised or flagged a clip as training purposes, the 4th clip they uploaded is deemed to be their first operational clip, as the majority of officers who had correctly labelled their uploaded clips upload between 1 and 3 clips during initial training.

⁷⁹ Borough 1 became live at 42% saturation in September 2014 as only 4 cameras were required to reach 50%. Borough 5 became live at the beginning of the trial period, May 2014, at 46% saturation as only 3 officers were required to make 50% and more than 3 officers uploaded operational footage within the first week of June 2014. These numbers were negligible, but significantly increased the boroughs’ time in the trial.

Figure 9: Flow of Officers in the Trial



* The number of officers entering the trial each month as a new borough goes live: May 14: 178(1 borough); July 14: 541 (4 boroughs); Aug 14: 539 (3 boroughs); Sep 14: 154 (1 borough); Feb 15: 98 (1 borough)

**Where officers have moved from treatment to control, only the treatment period of their trial participation has been analysed to avoid contamination of any treatment effect in control conditions. Where officers have moved from control to treatment, officers have been split into two records and analysed as separate participants.

***Includes 12 officers who moved from control to treatment

NB: 135 officers (61 treatment, 74 control) left the trial ERTs temporarily (e.g. extended annual leave, secondment) and then returned to a team in the same borough and condition. Data relating to officers during the time of absence has been removed from analysis however to avoid complication, this is not shown in the diagram above. This movement is not shown in the diagram to avoid complication.

Workforce Churn

Further potential limitations for the evaluation came from workforce churn, i.e. the movement of officers into and out of the ERT teams. Average workforce churn was monitored throughout the project and was higher than anticipated, with a monthly staff turnover of between 4% and 9% (approximately 20-50 officers leaving treatment teams and being replaced each month). This effectively caused a continuous training gap, with the central MPS BWV implementation team having to constantly address potential resistance from officers, and ensure they had the ability to use the technology and access equipment. This challenge confirms the ‘real world’ nature of the trial and whilst work was done with the central BWV implementation team to lessen the effect (e.g. monthly tracking of leavers and joiners) officer churn remained a threat to both the implementation of the trial and our ability to assess impact throughout the evaluation.

Annex B: Secondary Data Sources and Analysis

Officer Interviews

There were 19 officers from four boroughs selected to take part⁸⁰ in semi-structured face to face interviews with College of Policing researchers. For practical purposes, boroughs chose which specific officers were interviewed, which may add an element of bias; however they were provided with purposive sampling criteria in order to obtain a variety of experiences with BWV, which were a range of ages, genders, ethnic backgrounds, lengths of service and BWV usage patterns.

Interviews lasted 30 minutes to an hour, covering how the cameras were used by officers; how BWV may have affected their behaviour and decision making; the quantity and quality of the evidence they were gathering; their confidence and accountability; the impact cameras had on discretion; and team dynamics. More general implementation issues were also covered. As part of the interviews officers were asked to show one clip that best demonstrated their experience of using the cameras. This could include any benefits or challenges they had encountered; the choice of video was entirely at the officers' discretion. This provided participant led data on officers' experience and acted as a point of reference to explore officers' usage patterns during the interviews. The interviews were audio recorded, transcribed, and thematically analysed using dual coding to ensure consistency.

User Satisfaction Survey (USS)

MOPAC administer the MPS User Satisfaction Survey (USS)^{xxviii}, a random telephone survey of crime victims. It is a mandated assessment of satisfaction with those who have experienced police service provision as a victim of crime⁸¹. Regular analysis looks at overall satisfaction as well as satisfaction with: initial police action; treatment; and follow up. The USS is a random survey of victims, and some officers in the trial would have had more contact experiences than others reflected in the data.

To link with the impact of BWV, cases were given a BWV marker, so analysis could occur on anonymised records at borough level⁸². BWV marker cases were then compared to cases without a marker, which would include a limited number of non-ERT officers. A total of 4,042 cases were used for analysis (1,045 with BWV and 2,997 without), from interviews taking place between July 2014 and June 2015.

Stop & Search survey

A market research company, Opinion Research Services, were commissioned to conduct a survey of those members of the public stopped and searched by officers in the trial. The public were provided with a 'survey card' by the searching officer immediately following a stop with details of how to respond via an online, text/SMS or automated telephone survey. Using four short questions on scale ranging from 1 to 7, respondents were asked to indicate the extent to which they agreed the officer was respectful; professional; that a clear reason for the search was given; and whether they felt the search was justified. Officers in treatment teams were provided with different cards to those in control teams to allow comparison of responses. The survey ran from the 17th of March 2015 to the 31st of May 2015, however no results are reported here due to insufficient responses to make any meaningful conclusions (n = 14).

⁸⁰ Reason for borough selection: Borough 3 - consistently low saturation rate and the shortest trial period; Borough 4 - a digital magistrates courts; Borough 5 - the longest active trial period; Borough 9 - consistently high saturation rate.

⁸¹ Approximately 16000 victims spoken to each year via a telephone interview, which asks about their contact, the response and how they were treated by police. Crime types include Domestic Burglary; Violent Crime; Vehicle Crime and Hate Crime. Exclusion criteria: Under 18; Domestic Violence; Police Officers on duty.

⁸² Due to its complications with team allocation the borough of Borough 3 was removed.

Public Attitude Survey (PAS)

The general public were consulted around their views of BWV through MOPAC's Public Attitude Survey (PAS)^{xxix}. The PAS is well established⁸³, consulting London residents on a host of policing related topics. For the purposes of the trial some additional questions relating to the general awareness and opinions of BWV were added. Due to the randomisation of ERTs within boroughs during the BWV trial, before and after or between borough comparisons of PAS outcomes was more difficult, so rudimentary comparisons were made between trial and non-trial boroughs. This is limited, as the trial boroughs only have relatively few officers with cameras, and some non-trial boroughs may have historic pockets of camera use. There may also be differences in the trial and non-trial boroughs, based on the selection criteria used.

Sentiment Analysis

Sentiment analysis of Twitter activity was attempted through the Cosmos (Collaborative Online Social Media Observatory) platform to try to discover public opinion and first hand experiences BWV cameras. Key word searches (e.g. Body Worn Video), were performed for five days, however due to a very small number of relevant tweets and volume of unrelated tweets picked up no conclusions could be made from the research. This approach was then discontinued.

Officer attitudes

All officers in the treatment and control groups were asked to complete an online questionnaire. Due to the staggered 'go live' dates they were administered approximately at the beginning, middle and end of the 12 month trial period. Surveys were intended to give some understanding of the impact on officer attitudes and self-reported behaviour, and provide implementation learning.

Respondents were asked the extent to which they agreed or disagreed with a series of statements about their interactions with the public, the organisation and decision making using a scale ranging from 1 (strongly agree) to 7 (strongly disagree). The statements were designed to enable comparison of treatment and control officers' attitudes and self-reported behaviour. No reference to BWV was made in the statements allowing officers in the trial to respond to the same statements. Statements are shown in the tables below. In addition, treatment officers were asked BWV specific questions to provide implementation learning.

The questionnaire was designed so that single questions could be combined to give an overall understanding of an underlying concept. For example a score for the concept of 'certainty of sanctions' was created from three statements in the attitudes survey:

- I would be held to account if I under-performed in my role.
- I would be challenged if I didn't do my job properly.
- I would be disciplined if I broke the rules.

Some questions did not fit into a concept and therefore were analysed as a single indicator. The difference between the treatment and control groups questionnaire responses were tested via a range of statistical approaches (e.g. T-tests, Mann Whitney and Chi-squared).

Exploratory factor analysis⁸⁴ was undertaken on the responses from the second and third surveys' which included attitudinal statements separately. For an item to form part of a scaled variable it needed to have a factor score of 0.5⁸⁵ or more⁸⁶. The reliability of each scale was then checked using Cronbach's Alpha test. For a scale to be deemed suitably reliable, an Alpha score of at least 0.6 was required. This threshold was kept relatively low to allow the inclusion of some 3-item scales, as the

⁸³ First conducted in 1983 to give the MPS an understanding of the views of London residents.

⁸⁴ Extraction Method: Maximum Likelihood, Scree plot. Rotation Method: Direct Oblimin.

⁸⁵ One item was included that had a factor score of 0.48 as it made sense as part of the theme.

⁸⁶ Following guidance Field, A (2009), *Discovering Statistics Using SPSS*, third edition.

Alpha score is directly related to the number of items in a scale. The tables below show the results of the factor analysis for both rounds of the survey.

Differences in the mean scores of the newly created factors between the treatment and control groups were compared initially using a t-test. Where scaled variables were not normally distributed transformation was performed. In some cases the data was unable to be normalised through transformation, so non-parametric Mann Whitney tests were also performed on all scaled variables. As the results of t-tests and Mann Whitney tests were very similar for the normally distributed data, the results of the Mann Whitney tests have been reported for convenience.

Some questionnaire items did not load onto any scale so were treated as single indicators. In such instances Mann Whitney tests were performed on these items, as well as chi square tests (agree (1 – 3 on scale) vs. else (4 – 7 on scale)) to assure results. In these instances, only results with a p value of <0.01 have been reported to ensure reliability of results.

Factor Analysis Results (Officer Survey Round 3)

Scaled Variable	Contributory Variables	Factor Loading	Reliability Statistics	
			Cronbach's Alpha	N of Items
Protection Against Complaints	If a member of the public made a false complaint against me, it would get sorted out quickly. I'm confident people would believe my side of the story if a complaint was made against me. A complaint made against me with little evidence would be dropped quickly. I feel protected from malicious complaints when dealing with the public.	.92 .60 .83 .73	.86	4
Procedurally Just Policing	I explain the reason for a stop without fail. I make certain the person I am searching understands why they are being searched. I take the time to explain my decisions to members of the public. I allow members of the public to voice their opinion when decisions are made that affect them. I am polite to everyone regardless of how they behave.	.72 .74 .61 .53 .50	.73	5
Public Co-operation	The public I deal with tell me about suspicious activity. The public I deal with willingly assist me when asked. The public I deal with willingly provide me with information about suspects. When dealing with an incident, the public will follow my instructions. People are usually polite to me when I'm dealing with an incident.	.55 .77 .63 .66 .64	.80	5
Frequency of Force	On average, how often in the past 3 months have you drawn your baton? On average, how often in the past 3 months have you restrained a suspect on the floor (e.g. ground pin)? On average, how often in the past 3 months have you used a strike (e.g. palm heel strike/ knee strike)?	.53 .54 .91	.66	3
Quality of Evidence	I can gather good quality evidence at the incidents I attend. It's easy to get across how people behave in the evidence I gather. I have confidence that the evidence I gather will be sufficient to charge a suspect.	.56 .65 .56	.61	3
Compliance	I always follow the correct procedure when attending an incident. I make sure I stick to the protocols when dealing with an incident. I always do things strictly by the book whilst I'm out on shift.	.77 .86 .75	.78	3
Change in Accountability	I think twice before I stop and search someone nowadays. I need stronger grounds to stop and search someone than I did last year. I need stronger justification to use force than I did last year. I feel I need to justify the actions I take at incidents more than I used to.	.66 .88 .48 .50	.74	4
Certainty of Sanctions	I would be held to account if I under-performed in my role. I would be challenged if I didn't do my job properly. I would be disciplined if I broke the rules.	.75 .71 .73	.77	3
Supervisor feedback	I would gain recognition if I performed well in my job. It is acknowledged when I deal with an incident well. I would be praised if I showed notable improvement in my performance. If I delivered excellent service to a victim it would be recognised by my supervisors. My supervisor gives me constructive feedback that helps me to improve my performance. My supervisor helps me to identify areas where I could improve. My supervisor encourages and supports my development.	.79 .80 .85 .80 .90 .90 .79	.94	7

Analysis of Scaled Variables (Officer Survey – Round 3)

Scaled Variable	Median Response		Mann Whitney		
	Treatment Group	Control Group	U	P	Effect Size
Protection Against Complaints	4.50	3.75	30875.5	.000*	0.21
Procedurally Just Policing_v2	6.20	6.20	40028.5	.608	0.02
Public Co-operation_v2	4.40	4.40	38590.0	.216	0.05
Frequency of Force_v2	5.34	5.34	38527.5	.196	0.05
Quality of Evidence	5.50	5.00	32932.0	.000*	0.17
Compliance	6.00	6.00	39476.0	.424	0.03
Change in Accountability	5.13	5.25	36924.0	.037*	0.09
Certainty of Sanctions	6.33	6.33	40545.0	.800	0.01
Supervisor feedback	4.43	4.24	39955.5	.584	0.02

NB: T-tests were also performed on all scaled variables using the original or normalised data following transformation. Results for every variable was similar to that shown in the table.

* Significant

Factor Analysis Results (Officer Survey Round 2)

Scaled Variable	Contributory Variables	Factor Loading	Reliability Statistics	
			Cronbach's Alpha	N of Items
Protection Against Complaints	If a member of the public made a false complaint against me, it would get sorted out quickly. I'm confident people would believe my side of the story if a complaint was made against me. A complaint made against me with little evidence would be dropped quickly. I feel protected from malicious complaints when dealing with the public.	.79 .65 .77 .76	.83	4
Procedurally Just Policing	I explain the reason for a stop without fail. I make certain the person I am searching understands why they are being searched. I take the time to explain my decisions to members of the public. I allow members of the public to voice their opinion when decisions are made that affect them.	.72 .70 .69 .50	.71	4
Public Co-operation	The public I deal with willingly assist me when asked. The public I deal with willingly provide me with information about suspects. When dealing with an incident, the public will follow my instructions. People are usually polite to me when I'm dealing with an incident.	.78 .60 .63 .66	.76	4
Frequency of Force	On average, how often in the past 3 months have you drawn your baton? On average, how often in the past 3 months have you restrained a suspect on the floor (e.g. ground pin)? On average, how often in the past 3 months have you used a strike (e.g. palm heel strike/ knee strike)?	.56 .56 .81	.63	3
Quality of Evidence	I can gather good quality evidence at the incidents I attend. It's easy to get across how people behave in the evidence I gather. I have confidence that the evidence I gather will be sufficient to charge a suspect.	.60 .69 .56	.64	3
Change in Accountability	I think twice before I stop and search someone nowadays. I need stronger grounds to stop and search someone than I did last year. I need stronger justification to use force than I did last year.	.59 .90 .70	.76	3
Certainty of Sanctions	I would be held to account if I under-performed in my role. I would be challenged if I didn't do my job properly. I would be disciplined if I broke the rules.	.67 .86 .57	.73	3
Supervisor Support	My supervisor gives me constructive feedback that helps me to improve my performance. My supervisor helps me to identify areas where I could improve. My supervisor encourages and supports my development.	.97 .89 .82	.92	3

Analysis of Scaled Variables (Officer Survey Round 2)

Scaled Variable	Median Response		Mann Whitney		
	Treatment Group	Control Group	U	P	Effect Size
Protection Against Complaints	4.00	3.25	21678.5	.000*	0.26
Procedurally Just Policing_v1	6.00	6.25	28876.5	.204	-0.06
Public Co-operation_v1	4.00	4.25	29672.0	.441	-0.03
Frequency of Force_v1	6.33	6.33	30494.0	.793	0.01
Quality of Evidence	5.33	5.33	28828.5	.194	0.06
Change in Accountability_v1	4.33	4.33	29432.5	.358	-0.04
Certainty of Sanctions	6.33	6.33	30446,5	.770	0.01
Supervisor support	4.66	4.66	29293.0	.314	-0.04

NB: T-tests were also performed on all scaled variables using the original or normalised data following transformation. Results for every variable was similar to that shown in the table.

* Significant

Annex C: Body Worn Video Usage

BWV usage data was downloaded from the cloud storage system and used by MPS to save, share and use footage for the duration of the trial. The data included all clips uploaded between May 1st 2014 and April 30th 2015. Significant data cleansing was undertaken to exclude all duplicate clips and clips created from original footage, which would falsely inflate the volume of clips recorded.

The analysis presented below is of footage uploaded by officers in treatment teams of the trial boroughs only and excludes any clips uploaded prior to the officer’s borough live date or any other officers in the MPS who had the equipment. This is to present usage patterns in the context of the outcome data analysed (e.g. complaints, violent incidents etc.), which also excludes any incident occurring prior to each borough’s trial ‘go live’ date. All clips recorded prior to borough ‘go live’ dates are considered to be for training and familiarisation purposes and are not included in the report.

1) Overall BWV usage

1.1. Total trial figures

During the trial, BWV cameras were used to generate 48,086 clips, totalling 12,156 hours of video (an average of 14.9 minutes for each recording submitted). Of all the clips submitted, 13,616 (28%), totalling 4,650 hours, were tagged as “evidential” for potential use within the criminal justice system (CJS).

Figure 10 presents the total number of clips recorded each month, with the red data points indicating months when boroughs became operational in the trial. Overall, the total number of clips recorded per month increased reaching 6,770 clips (1,726 hours) recorded in April 2015. From February 2015 to April 2015, when all boroughs were operational in the trial, the average number of clips per month was 6,127 (1,563 hours – just over 65 days of footage). Finally, the average length of clips remained steady throughout the trial ranging from 14.6 to 15.8 minutes.

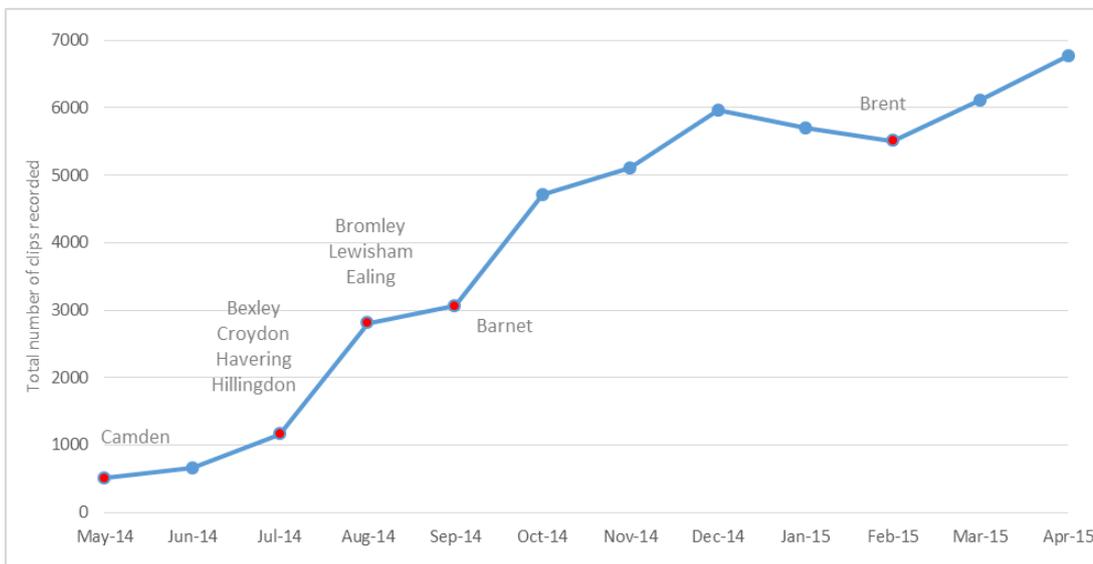


Figure 10: The total number of clips recorded per month by all boroughs:

**Red data points indicate the month when different boroughs became operational in the trial.*

Table 2. shows overall usage during the trial at the borough level. The total number of clips recorded vary depending on the borough, as well as the total length and average length. However, at this level figures are not comparable between boroughs due to the different length of time each borough spent ‘live’ in the trial.

Table 2: Borough level clips recorded during the trial

Boroughs	Total Number of Clips	Total Length of Clips (hours)	Average length of clips (min)	Month borough became operational
Borough 1	3363	990	17.7	Sept 2014
Borough 2	3410	760	13.4	Jul 2014
Borough 3	321	71	13.3	Feb 2015
Borough 4	5404	1226	13.6	Aug 2014
Borough 5	7214	2004	16.7	May 2014
Borough 6	7368	1709	13.9	Jul 2014
Borough 7	6556	1674	15.3	Aug 2014
Borough 8	4648	1084	14.0	Jul 2014
Borough 9	4645	1488	19.2	Jul 2014
Borough 10	5157	1150	13.4	Aug 2014

1.2. Evidential Footage

Table 3. shows the total number of clips flagged as evidential and the corresponding percentages per borough. The percentage of evidential clips tends greatly between boroughs, with Borough 8 being the lowest (14%) and Borough 3 being the highest (42%). Overall, from February 2015 to April 2015 the percentage of evidential footage remains quite steady ranging from 28% to 35%.

Table 3: Evidential Footage recorded per borough

Boroughs	Total Number of Clips Recorded	% of the overall footage collected
Borough 1	1221	36%
Borough 2	817	24%
Borough 3	136	42%
Borough 4	2216	41%
Borough 5	1946	27%
Borough 6	1714	23%
Borough 7	2110	32%
Borough 8	668	14%
Borough 9	1262	27%
Borough 10	1526	30%
Average		28%

1.3. Storage Requirements

Analysis of the amount of data in gigabytes (GB) generated during the trial has been undertaken based upon rolling totals of 31 day periods. This method is chosen over analysis of monthly totals to allow for busy periods that straddle two months to be identified. 31 day periods were also used as this is the length of time a clip not marked as evidential is retained for. The maximum number of GB generated within a 31 day period was between 28th of March 2015 to 27th of April 2015 – totalling 1377GB (7227 clips) from which 71% (5103 clips) were marked as non-evidential and deleted after 31 day period. The maximum GB generated for evidential footage was 566GB (2203 clips) in the period from 24th of January 2015 to 23rd of February 2015. The data used for this analysis does not show how long evidential footage was retained, as it is still required so not deleted during the trial. However, these figures are only applicable for the technology used in this trial, as different technology produces clips of different file sizes.

2) Temporal Analysis

Figure 11. displays the total number of clips recorded and the corresponding length during each hour of each day of a week. These figures are based on the start date and time of each clip. The number of clips recorded fluctuate depending of the time of a day or day of a week. Between 23:00 – 00:00 on Friday has the largest number of clips recorded in any given hour - 591 (144 hours) and between 23:00 – 00:00 Saturday night has the second largest number of clips recorded – 517 (121 hours). An interesting pattern emerges from the analysis; weekdays tend to have fewer but longer clips, while the weekends have more but shorter clips. One explanation of this pattern may be officers have more time to deal with incidents during periods of the week that tend to have fewer incidents or are attending different sorts of incidents at different days/times. Additionally, morning periods between 4:00 to 7:00 tend to have the fewest and the shortest overall duration of clips. Peaks in recordings may be a result of shift patterns rather than a result of increased demand on officers.

Figure 11: The total number and total length of clips recorded per hour of the week

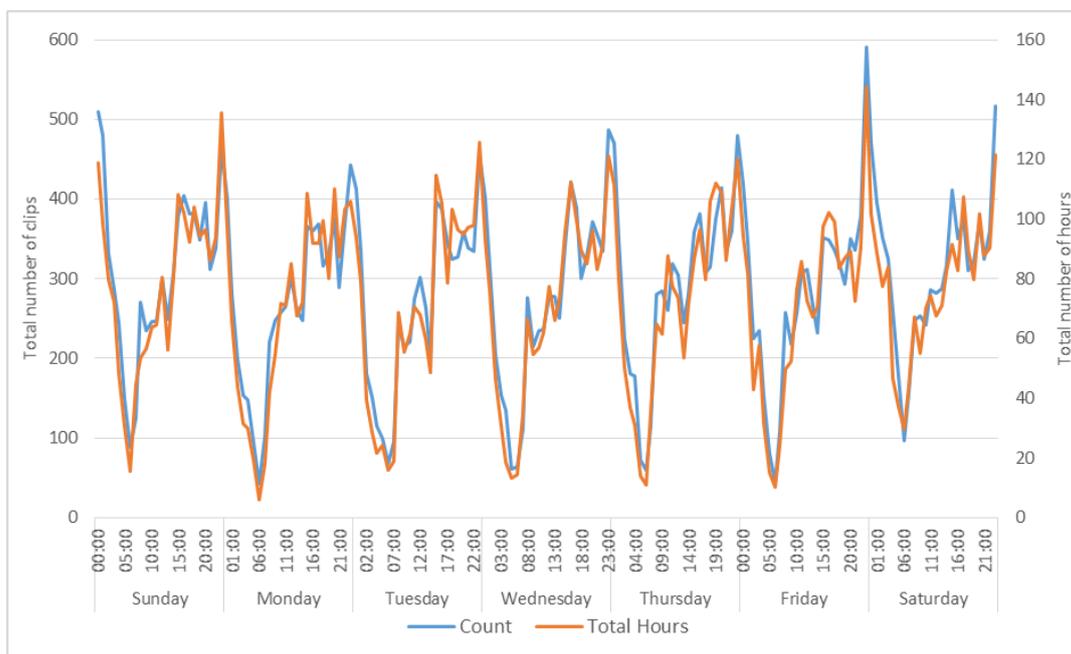


Table 4. displays the total number of clips and their corresponding total length depending of the day of a week. It should be noted that each total relates to all clips recorded between 00:00 – 23:59. Therefore a high proportion of clips recorded on Sundays will in fact relate to the early hours of the morning during officers’ Saturday night shifts.

Table 4: Differences in clips recorded and total length of clips via the day of the week

Day of Recording	Total Number of Clips Recorded	Total Length of Clips Recorded (hours)
Sunday	7469	1875
Monday	6440	1654
Tuesday	6443	1666
Wednesday	6538	1657
Thursday	6945	1758
Friday	6762	1697
Saturday	7489	1849

3) Officer usage of BWV

The profile of officer usage was covered in the implementation section. However, in addition.

Table 5. displays the rate of clips recorded per officer per month depending for each borough. This was calculated by dividing the total number of clips in a given operational month with the total number of police officers with cameras per borough, to allow easier comparison despite the variance in the boroughs' time in the trial. Figures 7 and 8 demonstrates the inconsistency in officers' use of BWV throughout the trial.

Table 5: Rate of clips recorded per officer per month

Borough	Rate: clips/per officer/per month
Borough 1	12
Borough 2	10
Borough 3	5
Borough 4	15
Borough 5	11
Borough 6	10
Borough 7	10
Borough 8	11
Borough 9	9
Borough 10	9

Figure 12. illustrates the total number of clips recorded depending on their length in minutes, however due to infrequency of clips longer than 100minutes, these were not included in the Figure 9. The most frequent length of clip recorded in the trial was between 2 – 4 minutes long (15.7%, 7560 clips). The longest clip recorded during the trial was 482min (8 hours) and the median clip length was 5 minutes 48 seconds.

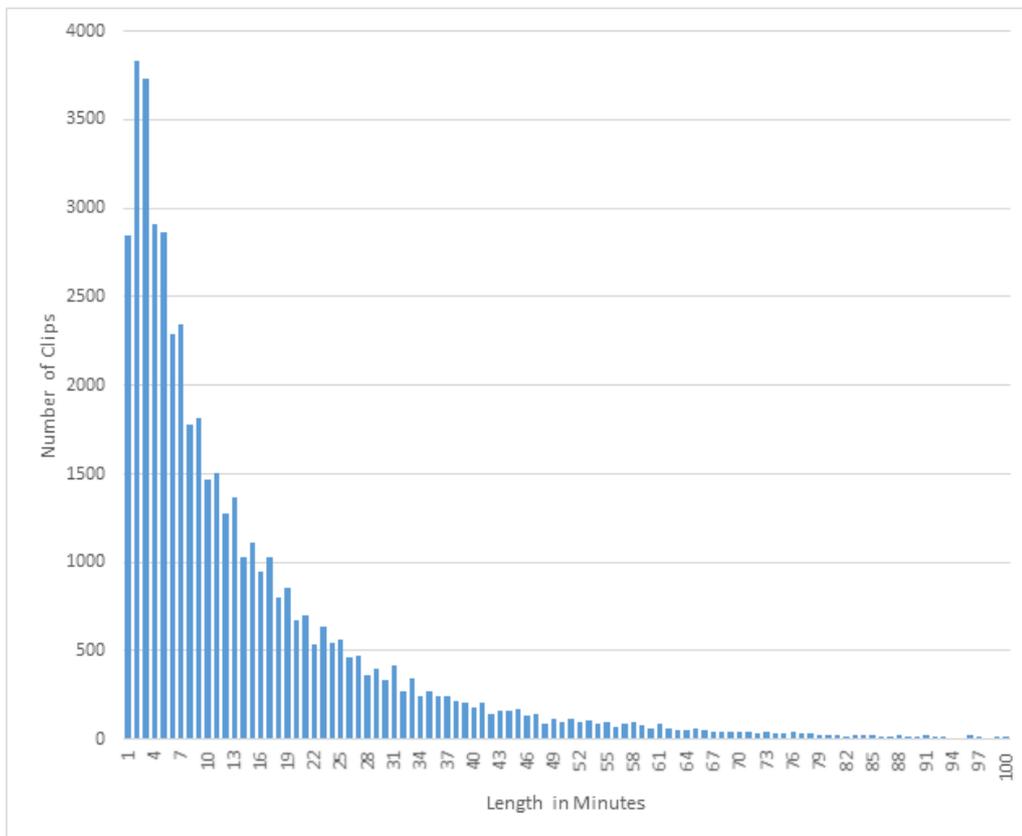
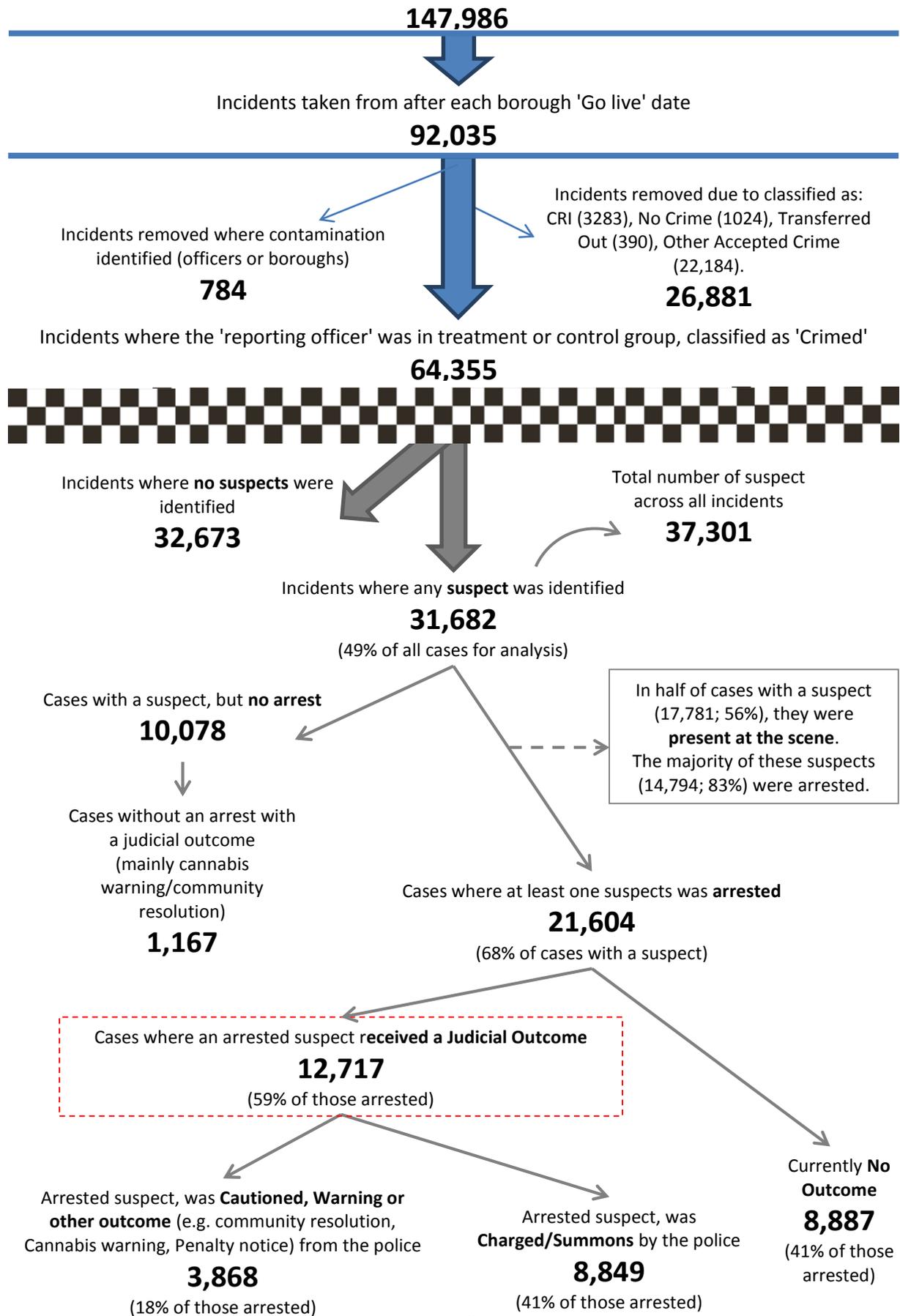


Figure 12: Number of clips recorded depending on the length of a clip in minutes

Annex D: Criminal Justice Case Attrition

All incidents reported to the Metropolitan Police between 1st May 2014 and 30th April 2015



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