Public Confidence and Crime Reduction: The Impact of Forensic Property Marking

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Acknowledgements

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Executive Summary

West Mercia Police treated domestic dwellings with Smartwater and their own We Don't Buy Crime (WDBC) campaign. The campaign included prominent signage. Using crime statistics, we estimate that the treatment is associated with a reduction of domestic dwelling burglary of between approximately 10-50%. However, whilst we see the treatment coincides with a reduction in domestic burglary, we cannot say that the treatment "caused" the reduction in burglary. This is because (a) the treatment was not randomly allocated to sites (as would have been the case if this were a gold-standard randomised controlled trial) and (b) the incidence of burglary is too low to be confident when comparing crime trends in treated and untreated areas. Using a survey of residents, we see that reduced fear of crime and increased confidence in policing are associated with awareness of the WDBC / Smartwater treatment. While we cannot rule out a causal effect where Smartwater / WDBC causes these improvements, it may merely be that those most aware of the police are least fearful and most confident. Work at COPR continues, widening the assessment of treatments to other police forces.

Foreword by Superintendent Tom Harding, West Mercia Police

Policing is currently facing unprecedented challenges with both increasing and changing demands. Questions of how precious resources are invested to protect the public from harm have never been more pressing. Under the West Mercia Police acquisitive crime project *We Don't Buy Crime*, I have sought to evaluate the impact of various burglary reduction strategies, with a focus on utilising SmartWater property marking. If we in policing are honest with ourselves, we do not have the requisite skills nor resources to conduct comprehensive multi-disciplinary research into the impact of such initiatives and, most importantly, the cost effectiveness of such investment.

Having been entrusted with funding from John Campion, the West Mercia Police and Crime Commissioner, it was imperative that I was able to provide a detailed evaluation of the impact of this work on crime rates, fear of crime and community confidence in policing and other authorities. I completed my Masters degree at Warwick University and therefore was delighted that Professor Jacqueline Hodgson and the interdisciplinary Centre for Operational Police Research (COPR) offered to work with us to evaluate this project.

I also wish to thank the numerous community volunteers, town and parish councils, University staff and students and, of course, my own staff who have enabled us to seek to protect in excess of 10,000 homes from burglary offences.

At this early stage, the burglary crime data collated and analysed by West Mercia Police indicates a significant drop in burglary dwelling offences in the areas where we have utilised SmartWater and We Don't Buy Crime property marking and associated joint signage. These reductions have been seen in both rural and urban communities. However, we will be working with the University to fully understand these figures and identify whether the reductions seen can be attributed to our interventions.

We have also received invaluable feedback from the COPR surveys conducted with these communities which will enable us to improve the provision of policing services to these communities and address their needs and demands.

I look forward to working further with COPR to help understand and shape our policing practice for the benefit of our communities.

I. Introduction

In August 2015, West Mercia Police approached the Centre for Operational Police Research (COPR), University of Warwick to help evaluate a number of burglary prevention interventions they were making in four sites across the Telford area. In particular, they were interested in the impact of property marking and related local publicity such as window stickers and street signage on public confidence in, and victim satisfaction with, policing, as well as on crime reduction. The principal interventions were firstly, 'SmartWater', a chemical residue that creates a unique code similar to DNA,[1] invisible to the naked eye, that acts as a deterrent to burglary by leaving UV ray detectible markings on property or those who handle it; and secondly, the police's own-branded 'We Don't Buy Crime', which used similar posters, stickers and street signage to that used in the areas where SmartWater was provided, but which relied on UV marker pens, rather than SmartWater. Given the large price difference between the two types of intervention, the police aimed to ensure effectiveness and value for money. SmartWater has been used in other parts of the country and the Metropolitan Police Service (MPS) in particular, have been impressed with its impact in reducing crime—though the MPS also increased policing in areas where SmartWater was deployed, making it hard to separate the effects of SmartWater from other police activities. However, the presumption that SmartWater serves as a deterrent lacks a strong empirical basis.[2] Thus West Mercia Police proposed a broader scheme of independent academic research, rather than the police's own assessment of effectiveness, to provide a more objective evidence base for policy.

The SmartWater interventions were part of a wider programme of initiatives designed to reduce crime and to increase public confidence in and victim satisfaction with the police. The programme involved the creation of SmartWater and 'We Don't Buy Crime' neighbourhoods where SmartWater and / or 'We Don't Buy Crime' packs were distributed to households and street signage warning off potential burglars was erected. The police explained that burglary was chosen as the focus of the crime prevention initiative because it is the most 'feared'[3] and 'will always be one of the most impactful crimes… that most people can fall victim to'.[4] The other interventions included: extending a code of practice on stolen goods to all second-hand and trade-in stores; encouraging people to register item serial numbers (i.e. smart phones, tablets and laptops etc) on a police database; and a 'cocooning' process[5] in which SmartWater burglary packs were given to victims of crime and 'We Don't Buy Crime' packs which were given to their immediate neighbours. This WAS the intervention, and not part of the "other interventions".

In comparison to other interventions, property marking was chosen because it was more cost effective, has a 'one stop effect' and therefore could be rolled out more easily because it is possible to mark all property. In contrast, 'target hardening' would have required a 'mix of different things for different houses and…become expensive'.[6] CCTV was also considered to be labour intensive because it needed to be physically monitored. More generally, it was hoped that the interventions would not only improve public confidence in policing but that it would lead to a reduction in burglary offences, reduce the costs of investigating those offences and help free up capacity.[7]

SmartWater was believed to be easier for the public to use and less invasive in comparison to UV property marking pens that require people to write their postcode and house number on their items: '[S]ome people don't like to write on the back of their new iPad' but will 'happily put a blob of SmartWater on.'[8]

The remit of the study was twofold: [1] to determine if SmartWater and 'We Don't Buy Crime' interventions reduced crime levels and, [2] to see if these interventions had any impact on levels of public confidence in and satisfaction with West Mercia Police.

Although heralded as an effective crime reduction tool, there has been little independent academic research into police use of SmartWater in the UK.[9] Prior to this report, the only notable evaluation was a pilot study

1   Beyond the domestic context SmartWater has been trialled in schemes aimed at preventing the theft of rail cables in the West Midlands (see P Pilsner, 'Chemical Romance', *Rail Professional,* 160 (2010), 25 – 27) and has been suggested as a means of reducing shop lifting (see Brian Ewart and Anne Tate, 'Policing Retail Crime: From Minor Offending to Organised Criminal Networks' in Kare T. Foeling (ed) *Criminology Research Focus* (New York: Nova Science Publishers, 2007)).
2   See Mike Sutton, 'Understanding and tackling stolen goods markets', in Fiona Brookeman et al (eds) *Handbook on Crime* (Devon: Willan, 2010), pp. 68 -84.
3   Interview Police Officer B
4   Interview Police Officer A.
5   The cocooning process includes alerting neighbours of burglary victims that there has been a nearby break-in and asking them to take some precautionary measure in response (in this case giving them We Don't Buy Crime packs to use). The process is designed to reduce further crime by minimising repeat victimisation and preventing similar burglaries of nearby properties. It operates on the proven trend of burglars re-targeting premises they have previously burgled or those adjacent to them.
6   Interview Police Officer B.
7   Interview Police Officer A.
8   Interview Police Officer A. SmartWater was trusted as a brand, in part, as a PCSO from Site B pointed out, because it had been developed with the input of a former police officer.
9   Smartwater is also used in commercial settings, involving the release of a spray on the offender. The more widespread domestic use involves simple property marking.

conducted by the MPS. The MPS study assessed the impact of distributing 1,000 SmartWater packs to homes and erecting 40 SmartWater street signs on crime levels in the London borough of Brent. The study claimed an 85% reduction in domestic burglary within areas protected by SmartWater, leading to projected savings of £500,000 and approximately 15,000 police hours. On the basis of these claims the scheme was rolled out to 440,000 homes in London.[10] However, the study was not an independent academic evaluation; it cannot rule out alternative accounts for the reduction in domestic burglary (such as increased policing), and it did not consider the longer term impact on public confidence.[11] By contrast, the current project used longitudinal mixed method research across SmartWater and 'We Don't Buy Crime' sites to explore if, how, and why SmartWater and 'We Don't Buy Crime' interventions can reduce crime and improve public confidence in, and victim satisfaction with, policing.

Knowing the exact impact that SmartWater interventions have on crime is important to West Mercia Police both on a budgetary and performance level. Like all police forces, West Mercia Police are attempting to tackle crime with reduced funding. It is therefore vital that they have an evidence-based understanding of the potential value of SmartWater and other interventions in terms of crime reduction, public confidence and victim satisfaction before committing further resources to their adoption on a wider scale. The findings of this report will assist West Mercia Police in devising a system of best practice for SmartWater, 'We Don't Buy Crime', and similar interventions, and will move them further towards their goal of increasing public confidence in, and satisfaction with, the force. This best practice could be extended to similar police forces that face the same resource restraints and challenges.

But the matter is not simply financial. West Mercia Police also have to adhere to certain standards in the delivery of their policing service. This duty on all police forces has resulted in a growing practitioner demand for research-led solutions to the challenges of crime reduction, public confidence and victim satisfaction.[12] Public confidence is vital for all police services as it sustains good community-police relations that lead to increased co-operation and crime reporting. Police effectiveness is often measured through levels of public confidence and victim satisfaction and these barometers have taken on greater importance since the establishment of Police and Crime Commissioners across England and Wales. West Mercia Police find themselves relatively poorly placed in rankings on victim satisfaction and public confidence and are keen to rectify this using research-led recommendations.

II. Fear Of Crime, Public Confidence And Victim Satisfaction

Many studies have explored public attitudes towards crime and policing and the factors that affect them. For instance, **fear of crime** is a significant factor that can be generated and heightened through signs of neighbourhood crime and disorder.[13] Fear of crime affects how individuals evaluate their own experiences of crime; for instance, victims in low crime areas classify their victimisation as an isolated incident whereas victims in higher crime areas are more likely to interpret it as an indicator of things to come amidst growing crime and disorder in the neighbourhood.[14] This process feeds into what is often referred to as the 'broken windows' theory of crime, which posits that the failure to tackle effectively minor acts of crime and disorder is a precursor to the neighbourhood descending into further and more serious crime and disorder.[15] This in turn creates a 'reassurance gap' whereby the public believes that crime and disorder are becoming increasingly prevalent while the capacity of the criminal justice system and the police to tackle it is diminishing.[16] As discussed below, we saw evidence of this in both high and low crime areas.

Research also shows that there has been a general decline in levels of **public confidence** in policing from the levels recorded in the 1980's,[17] which can have a negative knock on effect in terms of policing on the ground. A large body of evidence shows that higher levels of public confidence mean that people will place more trust in the police, more readily defer to police authority and will generally be more co-operative by coming forward with information, reporting crime and obeying the law.[18] There is, however, some difficulty in measuring public confidence in policing given that it can often get entangled in wider issues such as consent to policing and policing legitimacy, and the separation of national and local policing issues. One useful approach suggested in the academic literature is to view public confidence as 'something closer to a job rating'.[19] However, there is no obvious universal definition of a police officer's role; what constitutes 'good policing' differs according to individual expectations and experiences. In our surveys, one common feature was that respondents across all sites expressed the desire for a greater police presence in order to reassure the community and to facilitate communication, trust and intelligence gathering.

According to the available academic literature, public confidence revolves around four principal elements; perceptions of police effectiveness, fairness of personal treatment, level of police engagement and concerns about local levels of disorder.[20] Effectiveness concerns the ability of the police to fulfil their various remits including tackling crime and disorder, providing a visible presence and responding to emergencies. Fair treatment concerns the extent to which the police treat people with respect and whether they are helpful and friendly. Engagement is the extent to which the police listen to, and respond to, the concerns of the local community. Finally, disorder concerns the degree to which the police respond to local problems and signs of local disorder. As is evident from the above, confidence is linked to communicative interaction between the police and the public. Evidence shows that where this contact is considered to be good there can be an increase in recorded levels of confidence – albeit without significant evidence on the longevity of such improvement.[21] Relatedly, we know that the relationship between contact and confidence is asymmetrical: bad contact has a stronger (negative) impact on levels of confidence than does positive impact.[22] The British Crime Survey (BCS) has also consistently shown that unlike most other public services, the public's confidence in the police tends to decline after contact.[23]

13   I Brunton-Smith and P. Sturgis, 'Do Neighbourhoods Generate Fear of Crime?: An Empirical Test Using the British Crime Survey', *Criminology,* 49.2 (2011): 331-369.
14   Ibid.
15   James Q. Wilson and George L. Kelling, 'Broken Windows' in Roger G.Dunham and Geoffrey P. Alpert (eds.) *Critical Issues in Policing: Contemporary Readings* 7th ed. (Illinois: Waveland, 1982), pp. 395 – 407.
16   Chris Williams, 'Mapping the Fear of Crime- A Micro-approach' in Elaine Hogard, Roger Elis and Jeremy Warren (eds) *Community Safety: Innovation and Evaluation* (Chester: Chester Academic Press, 2007), p. 359.
17   Simon Merry et al., 'Drivers of public trust and confidence in police in the UK', *International Journal of Police Science & Management,* 14 (2) (2012), pp. 118 – 135; A Davies and R. Thomas, 'Dixon of Dock Green Got Shot! Policing, Identity Work and Organizational Change', *Public Administration,* 86.3 (2008), pp. 627-642.
18   E Stanko and B Bradford, 'Beyond Measuring 'How Good a Job' Police Are Doing: The MPS Model of Confidence in Policing', *Policing,* 3 (4) (2009a), pp. 322 – 330; J Fleming and E McLaughlin, ''The Public gets what the public wants': Interrogating the 'Public Confidence' agenda', *Policing,* 4(3) (2010), pp. 199 – 202; T R Tyler, 'Enhancing police legitimacy', *The annals of the American academy of political and social science,* 593(1), pp. 84 – 99; L Ren et al., 'Linking confidence in the police with the performance of the police: Community policing can make a difference', *Journal of Criminal Justice,* 33 (1) (2005), pp. 55-66.
19   Ben Bradford et al., 'Trust and Confidence in Criminal Justice: A review of the British Research Literature' in A. Jokinen et al., Review of Need: Indications of Public Confidence in Criminal Justice for Policy Assessment, (Bristol: Polity Press, 2008), p. 2.
20   Stanko and Bradford (2009a) above n 18.
21   B. Bradford, E. Stanko and J. Jackson, 'Using research to inform policy: The role of public attitude surveys in understanding public confidence and police contact', *Policing,* 3 (2) (2009b), pp. 139 – 148. In our own research, despite communications between the Parish council, residents and police appearing to be good in Site A, respondents showed low levels of confidence and satisfaction with policing.
22   A Myhill and B. Bradford, 'Can police enhance public confidence by improving quality of service? Results from two surveys in England and Wales', *Policing and Society,* 22 (4) (2012), pp. 397-425.
23   Bradford, Stanko & Jackson (2009b) ibid.

10   A 1-page report of this pilot study, 'Case Study: London Borough of Brent,' is available at https://www.smartwater.com/wp-content/uploads/2016/12/Case_Study_Brent.pdf
11   There is inherent scepticism among critical criminologists about the findings of in-house police research and the extent to which it would or could ever identify fundamental flaws in existing or proposed policing practice and policy. See M Weatheritt, *Innovations in Policing* (London: Croom Helm, 1986).
12   Robert Reiner, *The Politics of the Police* 4th ed. (Oxford: Oxford University Press, 2010).

Existing academic literature has defined victim satisfaction as 'a retrospective assessment of a particular encounter or interaction with the police'.[24] Some studies have focussed on general victim satisfaction while others have focussed on victims of particular crimes like domestic violence. Unlike public confidence studies on general attitudes towards policing, victim satisfaction studies seek to establish the views of victims who have had first-hand experience of the police response to crime and disorder.

When evaluating the police response, victims typically rate both the quality and the outcome of the procedure, that is, how they were treated by the police and whether this resulted in a satisfactory conclusion, such as the return of stolen property or the apprehension of the culprit.[25] The significance for understanding how victims are treated lies in a criminological theory labelled *procedural justice*, which can be further broken down into (i) *interpersonal justice* (the levels of respect and propriety shown towards victims by the police), and (ii) *informational justice* (the level of information victims are given by the police about police procedure and the progress of their case).[26] In terms of outcome, it is unsurprising that victim satisfaction increases when the police solve the reported crime and when stolen property is returned.[27] Of particular relevance to our study, we know that burglary victims tend to be less satisfied with police handling of their cases compared with, say, public order offences that can be resolved more quickly[28] – possibly because stolen property is rarely returned to its owner.[29] This dissatisfaction is heightened if the victim has been targeted before, largely due to the fact that victims are more likely to blame the police for failing to pinpoint or arrest the culprits.[30] Accordingly, academic literature indicates that factors impacting on victim satisfaction will include the demeanour of police officers, their levels of proficiency, the degree of concern shown towards the victim, how long they spent at the crime scene, the extent of further contact and communication and the overall outcome of the case.[31]

III. Property Marking Schemes

Property marking has consistently been seen as an appropriate response to the threat of domestic burglary. As a preventive measure, it seeks to reduce crime and also, as a visible intervention, to increase levels of public confidence in policing. It operates on the premise that marked property is not only less likely to be targeted but also more likely to be successfully returned to the owner if it is recovered. This is particularly true in the case of SmartWater which contains a unique chemical code in each batch. West Midlands police have used property marking in the consolidation phase of their 'crackdown and consolidation' on domestic burglary and anti-social behaviour.[32] Property marking is typically used to guard against the theft of 'hot products' – those products targeted by offenders for their value, concealability, removability and ease of disposal.[33] Current 'hot products' include smart phones, tablets and laptops,[34] items that are not only very valuable but also easily removed by offenders who can take advantage of a ready market for their disposal. Property marking schemes are usually well publicised in the area with posters and stickers on prominent display to warn off potential offenders. This is seen as an added deterrent, indicating to potential offenders that the cost of targeting a particular property has risen.[35]

However, doubts remain about the ability of property marking schemes to reduce and deter domestic burglary. While these schemes are among the easiest to implement, and there is some evidence that they provide reassurance to the public,[36] their effectiveness has yet to be explored through robust independent research.[37] Existing studies question the efficiency and effectiveness of these schemes. Research in South Wales, the US and Sweden has highlighted the limitations of property marking as a deterrent to burglary and revealed that there are no significant changes in area-wide crime or the retrieval rate of stolen property that is successfully returned to its original owner.[38] Moreover, in research undertaken by the UK Home Office only 25% of offenders said that they would be deterred by property marking schemes.[39] A study on property marking schemes using SmartWater technology in Nottingham and Mansfield further suggested that offenders were largely unconcerned by such interventions and would continue to target properties in the area regardless. Reasons cited for this included the short space of time it took to dispose of stolen goods either through selling or receiving, the fact that markings are not visible to the naked eye of the buyer and a belief that markings can be scratched off the surface of stolen goods.[40] The responses of our own, admittedly small, sample of offenders, is also in line with these findings.

In contrast to this literature, research undertaken for the SmartWater brand of property marking, presents it as one of the most effective crime reduction tools. For example, a survey of 101 offenders in Doncaster – supported by South Yorkshire police[41] – claimed that 91% of offenders were aware of SmartWater and 74% would be put off breaking into a property with a SmartWater label on it. The study concluded that SmartWater was ranked as the greatest deterrent by offenders participating in the survey, scoring more highly than other measures such as CCTV, electronic tagging or high visibility police patrols. Like the MPS study, it is difficult to evaluate the reliability of these claims as there is little information on the methodology used. Moreover, the Doncaster study was carried out for SmartWater by a consultancy firm, rather than an independent academic team. The value of property marking schemes and the ways in which they have been evaluated are strongly contested in some quarters.

Any arguments that property marking schemes work by projecting some form of paranoia into the minds of thieves and buyers remain completely untested by independent research and are completely unfounded and should, therefore, be treated with what is best described as healthy scientific scepticism. No matter how plausible the commercial marketers of these systems appear, at the time of writing – without fully and genuinely independent evaluation – their products are arguably no better than expensive crime reduction quackery.[42]

24   Andy Myhill and Paul Quinton, 'Confidence, Neighbourhood Policing, and Contact: Drawing Together the Evidence', *Policing*, 4 (3) (2010), pp. 273 – 281.
25   Malini Laxminarayan et al, 'Victim Satisfaction with Criminal Justice: A Systematic Review', *Victims & Offenders*, 8 (2) (2013), pp. 119 – 147; K. Murphy, 'Public Satisfaction With Police: The Importance of Procedural Justice and Police Performance in Police-Citizen Encounters', *The Australian and New Zealand Journal of Criminology*, 42 (2) (2009), pp. 159-178; M.J.J. Knust, S. Rutten and E. Knijf, 'Satisfaction With the Initial Police Response and Development of Posttraumatic Stress Disorder Symptoms in Victims of Domestic Burglary', *Journal of Traumatic Stress*, 26, (2013), pp. 111-118.
26   Laxminarayan et al (2013) ibid.
27   T. Coupe and M. Griffiths, 'The influence of police actions on victim satisfaction in burglary investigations', *International Journal of the Sociology of Law*, 27 (1999), pp. 413-431.
28   Ibid.
29   M Sutton, 'How Prolific Thieves Sell Stolen Goods: Describing, Understanding and Tackling the Local Markets in Mansfield and Nottingham', *Internet Journal of Criminology* (2008).
30   R.I. Mawby, 'The Impact of Repeat Victimisation on Burglary Victims in East and West Europe', in G. Farrell and K. Pease (eds), *Repeat Victimisation*, (New York: Criminal Justice Press, 2001) pp.69-83, at p. 78.
31   Coupe & Griffiths (1999) above n 27. Our own survey respondents expressed concern about a lack of *informational justice* – describing a failure of officers to follow up on complaints or to provide information on how the crime was dealt with.

32   Andrew Millie, 'Reducing burglary by crackdown and consolidation', *Policing: An International Journal of Police Strategies & Management* 28 (1) (2005), pp. 174-188.
33   Charlotte Harris, Chris Hale and Steve Uglow, 'Theory into practice: implementing a market reduction approach to property crime' in Karen Bullock and Nick Tilley (eds) *Crime reduction and problem-oriented policing* (London: Routledge, 2011).
34   M Sutton, 'How Prolific Thieves Sell Stolen Goods: Describing, Understanding and Tackling the Local Markets in Mansfield and Nottingham', *Internet Journal of Criminology* (2008).
35   Gloria Laycock, 'Property Marking: A deterrent to domestic burglary?' (London: Home Office, 1985).
36   Cambridgeshire County Council's Research Group, 'An Evaluation of a forensic property marking scheme in Cambridge', (Cambridge: Cambridge City Community Safety Partnership, 2010); Laycock (1982), ibid.
37   Harris, Hale & Uglow (2011) above n 33; Mike Sutton, 'Understanding and tackling stolen goods markets' in Fiona Brookeman et al (eds) *Handbook on Crime* (Devon: Willan, 2010), pp. 68 – 84; Laycock (1982) above n 35.
38   Ibid.
39   Ian Hearnden and C Magill, 'Decision-making by house burglars: offender's perspectives' (London: Home Office, 2004).
40   Sutton (2008) above n 34.
41   Perpetuity Research and Consultancy, 'An Evaluation of SmartWater: Offender's Perspectives' (2008).
42   Sutton (2010) above n 37.

IV. Site Interventions

Interventions were designed by the police before the involvement of COPR. Interventions were carried out in four different sites (A-D) across the police force area and a fifth site (E) – where no intervention took place – was surveyed as a control. The sites were in and around the Telford area. Although these areas are within close proximity to one another, each has its own particular demographic makeup and particular localised challenges. What all the sites have in common, according to the police officers driving the interventions, is that previous interventions and schemes had proven ineffective in reducing levels of crime:

> The reason for picking those [the four sites in Telford] was that if you look over the last two decades they've been high crime areas and certainly high burglary dwelling areas for a long time so certainly nothing we are doing or we've been doing in the past has really made much of a difference.[43]

Site A is a quiet rural area that consists of approximately 1,500 houses, of which 1,400 were given SmartWater. As part of this initiative, all properties in the area were offered SmartWater kits and SmartWater signage warning off potential burglars was erected. Site A is different to the Telford sites both geographically and demographically. It has an older population and higher levels of affluence which make it attractive to potential burglars from outside the area. Unlike the other sites in the study, Site A had considerable 'buy in' from the local community because the intervention in that area was community-led rather than police driven from the outset. The parish council was keen to engage with the police to curb travelling criminality in Site A following the closure of the local police station. They secured funding to pilot a SmartWater intervention in their area in conjunction with West Mercia Police. In contrast to the other sites, local volunteers and police cadets delivered the SmartWater packs to households. The launch of the intervention was publicised by the local media.

Site B is a predominantly working class area of Telford that is enclosed by a ring road. Social housing accounts for most of the residential properties in the area. These properties are either in larger estates or in housing blocks containing a high volume of houses but little open space. A shopping complex is the commercial hub of Site B and is in close proximity to the local school and the youth club. Some newer housing developments are also appearing in the area. The intervention at Site B also involved the distribution of SmartWater kits to properties and the erection of SmartWater street signage. Geographically and demographically it has high unemployment and a younger population.

Site C is the largest geographical site and includes several housing estates, some privately owned and some social housing. Housing here is less spatially confined than in Sites B and E, yet not exactly as widely dispersed as in Sites A or D. It also contains considerably more green areas than both Sites B and E. Like Site B, the intervention in Site C involved the distribution of SmartWater kits to properties and the erection of SmartWater street signage. The police regard the site as suffering from significant levels of acquisitive crime.

Site D is one of the more affluent and quieter areas in Telford. The area has significant levels of newer and more upmarket housing than the other sites. As such, it has a particular problem with burglaries. Residential properties in the area are a mixed composition of private dwellings and social housing. This diversity means that residential buildings in the area includes housing estates, apartment complexes and detached buildings. There are also a number of local shops and pubs in the area as well as a local play park. The intervention in Site D involved the distribution of 'We Don't Buy Crime' packs: West Mercia Police-branded property marking packs containing a UV pen and 'We Don't Buy Crime' stickers. 'We Don't Buy Crime' signs, which are similar in appearance to the SmartWater signs (but do not display the SmartWater symbol) were erected at the Site. Demographically, Site D has higher levels of employment and an older population than sites B,C and E.

Site E is similar to Site B and is made up of predominantly social housing enclosed by a ring road. It served as the control site in the study. No active interventions were made in the area, but burglary victims were part of a force-wide cocooning process, in which the victim was issued with SmartWater and the ten immediate neighbours with 'We Don't Buy Crime' packs. In terms of demographics, Site E is one of the more socio-economically deprived areas of Telford with a young population and higher levels of unemployment.

There is potentially much to be learned from this programme of burglary prevention measures. Across a variety of sites, different types of intervention have been put in place, most police-driven and one mobilising a range of community-led support in the distribution and implementation of SmartWater and other initiatives. It is important for the police to understand what works and whether the success of an intervention depends on what it is, and how and where it is implemented. This is vital to allowing West Mercia Police practice and policy

to be fully informed about the potential costs and benefits of adopting the interventions on a wider scale – something acknowledged by the force itself:

> Whether [the various interventions are] successful will help shape decision-making around what interventions we'll look to do in the future, and where we would look to do them. So actually, do they work well in rural areas but not in your high population areas, your less affluent areas? So trying to understand what works where and then...the PCC controls the funding for these sorts of initiatives now, and quite rightly, they want to know that the initiative will be evaluated, enabling sound future decision-making re spending on such initiatives.[44]

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43   Interview Police Officer A, February 2017.

44   Ibid.

V. Methodology

The current research adopted a mixed methods approach to determine changes in the levels of crime, public confidence in, and victim satisfaction with, the police. This involved the use of surveys, one-to-one interviews, and crime data provided by the police across the force area.

Surveys. To measure change in attitudes towards, and confidence in, the police, we collected survey data at three different time points: prior to any intervention being made; in the weeks immediately after the interventions had been completed; and five to six months after the interventions. The use of survey data is a standard methodological practice in research on attitudes towards policing and crime, and can be used to measure public opinion and confidence over time.[45]

A copy of the survey is presented in Appendix A. The survey asked respondents a number of questions relating to fear of crime, attitudes towards policing, local levels of crime and disorder and the performance of the local police. These questions were largely modelled on the Crime Survey for England & Wales (CSEW). We asked people to provide demographic information, specifically age, gender, and ethnicity, which enabled us to compare our findings against census data.[46] First, the survey asked respondents how much they feared specific crimes using a scale from *very worried* to *not at all worried*, and to indicate how much their quality of life is affected by fear of crime on a 10-point scale from *no effect* to *total effect*. Next, respondents were asked to indicate the extent to which they agreed with a series of statements about the police in their area. These questions were designed to provide a more nuanced understanding of confidence in policing.[47] Statements included: *You should do what the police in this area tell you, even if you disagree; The police in this area can be trusted to make decisions that are right for the people in this neighbourhood; They (the police in this area) are dealing with things that matter to people in this community.* Respondents provided ratings on a 4 or 5 point scale from *strongly agree* to *strongly disagree*. From a list of eight common crimes and forms of antisocial behaviour, respondents were asked to indicate the extent to which each of these factors was a problem in their area. The scale ranged from *a very big problem* to *not a problem at all.*

To measure victim satisfaction, the survey asked respondents if they had been the victim of a crime in the previous 12 months. Respondents were asked to include both serious incidents and 'small things too'. Victims of crime were asked to outline briefly what happened, where the incident took place, whether the police were aware of the incident, and whether they believed the police had treated them fairly and with respect. Finally they were asked how satisfied they were with the police handling of the matter, on a 5-point scale from *very satisfied* to *very dissatisfied,* or *too early to say.* Previous studies suggest that including these questions is the best way to gauge the levels of reporting by victims and their evaluation of how the police handled their case.[48]

We asked if the respondent or any other household member were serving police officers or whether they have had any contact with the police in the last 12 months. These questions were included to determine if experience of, or contact with, the police affects public confidence or satisfaction levels, as suggested by the literature. Respondents indicated how satisfied they were with their life overall on a scale from 1 = *completely dissatisfied* to 7 = *completely satisfied*. They were asked if they have contents insurance (*yes, no, don't know*).

The surveys disseminated in the second and third waves asked respondents an additional question about their awareness of the interventions that had taken place. The question was the same across all five sites, regardless of the intervention that had taken place in the respondent's area.

The survey concluded with a blank text box where respondents were invited to tell us about anything we may have missed in the survey or to simply share any further thoughts and views they had on crime and policing. Many respondents left the box blank but some went into considerable detail about their opinions of crime and policing both nationally and locally. Other respondents used the text box to vent frustration about issues like parking and the general state of the country that were not strictly part of the study's remit nor indeed within the functions undertaken by police.

To encourage participation, respondents were offered the opportunity to enter into a £100 cash or voucher prize draw. This is standard practice in survey-based academic research.[49] One £100 prize was awarded in each of the 5 sites at the end of the study period.

Survey dissemination: Table 1 shows the total number of surveys disseminated and completed at each of the sites. The distribution numbers are likely to be an over-estimate, as we were reliant on an accurate count of the remaining surveys once delivery was complete. Site A was the first site surveyed and provided us with the opportunity to review and refine our procedure for disseminating surveys in the other sites. Initially, the Site A survey was conducted online, but uptake was poor despite advertising via leaflets and in local shop windows. After ten days, we recruited undergraduate students to go on-site with hard copies of the survey in an attempt to increase uptake.

We reviewed our method of distribution before surveying the remaining sites and decided to supplement the online uptake by distributing hard copies of the survey to residents across each site and providing freepost envelopes for respondents to return their completed surveys. This was much more successful than relying on online responses. Previous studies have successfully used postal surveys,[50] while others have also used them in conjunction with electronic methods of collecting data.[51] There are, of course, drawbacks to using this approach; postal surveys can skew the demographics in favour of older respondents[52] and there is a risk, however small, of a 'mode effect' whereby the different means of collecting data elicits different responses.[53] However, one considerable advantage is that respondents are more likely to disclose information in postal surveys that they would not be prepared to disclose to researchers in face-to-face interviews.[54] Indeed, many of the responses contained personal experiences of policing and crime that the researchers may not have learnt about had the survey been administered orally, face-to-face.

Table 1. Approximate number of surveys distributed, and total number completed, at each site by survey wave.

Site	Surveys distributed at each wave			Surveys completed at each wave		
	Wave 1	2	3	1	2	3
A	1300	1300	1300	155	119	67
B	1200	1200	1000	146	130	20
C	1600	1600	1600	205	215	44
D	1200	1200	1200	150	90	29
E	1700	1700	1700	91	174	31

Note: Due to an administrative oversight, 323 postal surveys were destroyed during the third wave before we could obtain them.

Hard copies of the first wave of surveys with freepost return envelopes to return surveys directly to the University (not the Police) and an online link if preferred, were distributed in Sites B – E by Police Community Support Officers (PCSO) from West Mercia Police in November 2015. Posters highlighting the survey were displayed in prominent spots across the sites. Again, we dispatched research assistants to each site to gather further responses in the streets, but it proved inefficient, resulting in few responses and so was discontinued. Postal surveys were also used for Waves 2 and 3. In Site A, hard copies were distributed by West Mercia Police with the help of local volunteers, including police cadets. In the other sites, the surveys were distributed again by PSCOs from West Mercia Police with the assistance of researchers and others largely, but not exclusively, recruited from the student body at Warwick University. Wave 2 surveys were distributed in July 2016 and Wave 3 surveys in December 2016.

One-to-one interviews. To gain an insight into the thinking behind each of the interventions from the police perspective and also the police view of whether the interventions have made any noticeable impact in the sites to date, we held short interviews with members of West Mercia Police. Those interviewed included senior members of the force tasked with planning and implementing the various interventions, and seven PSCOs who were regularly on the beat in the various sites. Interviewing those in desk-based positions and those on the

45   B. Brown and W.R. Benedict, 'Perceptions of the police past findings, methodological issues, conceptual issues and policy implications', *Policing: An International Journal of Police Strategies & Management,* 25.3 (2002); 543-580.
46   I Brunton-Smith and P. Sturgis, 'Do Neighbourhoods Generate Fear of Crime?: An Empirical Test Using the British Crime Survey', *Criminology,* 49.2 (2011): 331-369.
47   B Bradford and A Myhill 'Triggers of Change to Public Confidence in the Police and Criminal Justice System: Findings from the Crime Survey for England and Wales Panel Experiment', *Criminology and Criminal Justice*, 15.1 (2015): 23-43.
48   R.I. Mawby, 'The Impact of Repeat Victimisation on Burglary Victims in East and West Europe', in G. Farrell and K. Pease (eds), *Repeat Victimisation,* New York: Criminal Justice Press, (2001) pp.69-83.

49   J. Jackson, 'A psychological perspective on vulnerability in the fear of crime', *Psychology, Crime and Law,* 15.4 (2009), pp. 365-390; Brown and Benedict (2002).
50   Jackson (2009) ibid; K. Murphy, 'Public Satisfaction With Police: The Importance of Procedural Justice and Police Performance in Police-Citizen Encounters', The Australian and New Zealand Journal of Criminology, 42.2 (2009): pp. 159-178; Kristina Murphy and Julie Barkworth, 'Victim Willingness to Report Crime to Police: Does Procedural Justice or Outcome Matter Most?', *Victims & Offenders,* 9 (2) (2014),pp. 178 – 204.
51   J Byrne, J Topping and R Martin, 'The Influence that Politicians, Community Leaders and the Media have on Confidence in the Police in Northern Ireland', Belfast: Northern Ireland Policing Board (2014).
52   Merry et al. (2012) above n 17.
53   Bradford and Myhill (2015) above n 47.
54   Steven G Brandl and Frank Horvath, 'Crime-victim evaluation of police investigative performance', *Journal of Criminal Justice,* 19 (2) (1991), pp. 109-121.

ground was felt to be an appropriate way of qualitatively gauging whether there was any disconnect in terms of the rationale underpinning the interventions at a policy level and the impact that they were actually having on the ground. This additional, qualitative data was also compared with the qualitative data gleaned through the text box comments of the surveys. All but one of these interviews was conducted over the telephone. The interviews were recorded and then transcribed by a research assistant. The interviews were semi-structured[55] and contained questions designed to draw out the rationale behind the interventions, individual views on how successful they have been or are likely to be, and how they have led to any changes in community-police relations that might suggest an increase in public confidence. Although the individual data sets generated by the interviews were small, they were nonetheless analysed by the researchers under the survey question themes. This involves coding data thematically and identifying broad areas of commonality across data sets that point to emergent or dominant themes.[56]

We also conducted a small number of telephone interviews with offenders convicted of acquisitive crime offences to determine how effective SmartWater interventions are as a crime deterrent. The criminological literature acknowledges the value of engaging with such constituencies when trying to gain insight into particular phenomena related to policing and crime.[57] We did not recruit these participants directly but relied on local probation services to identify and approach suitable participants on our behalf. The telephone interviews took place when offenders were scheduled to attend probation offices, for the convenience of participants. The telephone interviews were also considered to enhance confidentiality and anonymity and subsequent quality of data. Consequently, two interviews were carried out with offenders from the control site outside Telford and two interviews were carried out with offenders attached to the probation service in Telford. As with the police interviews, an interview guide was used to help focus the discussion. The interviews were recorded and then transcribed by a research assistant.

The University of Warwick Humanities and Social Science Research Ethics Committee granted ethical approval for this project. In addition, as this research involved offenders who had been accessed through probation services, the National Offender Management Service (NOMS) granted approval for the offender interviews.

VI. Survey Findings

The total number of surveys completed across all sites and all waves was 1666. Table 2 shows the distribution of the sample across sites and Table 3 displays the distribution across age group.

Table 2 Survey sample across sites

Site	Female	Male	Unreported	Total
A	155	137	49	341
B	169	111	16	296
C	279	146	39	464
D	156	88	25	269
E	164	94	38	296
Total	923	576	167	1666

Table 3 Distribution of people across sites by age group

	Under 30	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 or over	Unreported	Total
A	6.74	8.50	7.62	10.26	16.72	17.01	6.45	26.69	100.00
B	9.12	11.15	11.15	15.54	26.01	18.24	6.08	2.70	100.00
C	3.66	6.47	14.44	17.89	31.47	14.44	6.68	4.96	100.00
D	7.81	11.15	15.99	21.93	23.05	13.01	4.09	2.97	100.00
E	10.47	14.19	12.50	13.18	26.01	10.47	3.04	10.14	100.00
Total	7.14	9.84	12.36	15.73	25.15	14.71	5.46	9.60	100.00

Public perceptions about policing and crime were explored across five themes: confidence in policing, fear of crime, satisfaction with policing, problems in area, and awareness of interventions. Five scores were built based on the averaged responses to questions belonging to each of these themes (displayed in Table 4) in line with the use of the items in the CSEW.

The sections below start by describing a summary of the main findings across the themes, together with the most relevant demographic differences found. The next part considers how specific local problems affect, on one hand, confidence in policing and police satisfaction, and, on the other hand, overall quality of life. The last two parts explore victims' perceptions and the effects of interventions on overall fear of crime.

55   E Fossey et al., 'Understanding and Evaluating Qualitative Research', *Australia and New Zealand Journal of Psychiatry*, 36 (2002), pp. 717.
56   L Richards, *Handling Qualitative Data: A Practical Guide* (London: SAGE, 2005), p. 97.
57   L Roberts and D Indermaur, 'The Ethics of Research with Prisoners', *Current Issues in Criminal Justice*, 19 (3) 2007-2008, pp. 309-326.

Table 4 Survey Items Used to Construct the Five Measures

Confidence in Policing (1 "Strongly agree" to 4 "Strongly disagree")
– You should do what the police tell you, even if you disagree
– You should accept decisions made by the police, even if you think they are wrong
– You should do what the police tell you to do, even when you don't like the way they treat you
– The police abuse their power (reverse coded)
– The police can be trusted not to exceed their authority
– The police think they are above the law (reverse coded)
– The police reflect the mix of people in your community
– The police act in ways that are consistent with my own ideas about what is right
– The police can be trusted to make decisions that are right for this neighbourhood

Satisfaction with Policing (1 "Strongly agree" to 5 "Strongly disagree")
– The police can be relied on to be there when you need them
– The police would treat you with respect if you had contact with them for any reason
– The police treat everyone fairly regardless of who they are
– The police understand the issues that affect this community
– The police are dealing with the things that matter to people in this community
– Taking everything into account I have confidence in the police in this area

Fear of Crime (1 "Very worried" to 4 "Not at all worried")
– Being physically attacked by strangers
– Having your home broken into and something stolen
– Having things stolen from your car
– Having things stolen from outside your home
– Being mugged and robbed
– Having your personal items stolen from you while you are out and about
– Being subject to a physical attack because of your skin colour, ethnic origin or religion
– Being raped

Awareness of interventions (1 "Aware of intervention" and 2 "Unaware of intervention")
– The distribution of free SmartWater packs and crime deterrent stickers to local residents
– The distribution of free SmartWater packs and crime deterrent stickers to burglary victims
– The distribution of free UV pens and crime deterrent stickers to all local residents
– The distribution of free UV pens and crime deterrent stickers to neighbours of burglary victims
– Signs in the area advertising the 'Designing out crime' campaign
– Signs in the area advertising the 'We don't buy crime' campaign

Problems in Area (1 "A very big problem" to 4 "Not a problem at all")
– Abandoned or burnt out cars
– Speeding traffic
– People using or dealing drugs
– People being drunk or rowdy in public places
– Noisy neighbours or loud parties
– Rubbish around
– Teenagers hanging around on the streets
– Vandalism, graffiti and other deliberate damage to property or vehicles

General perceptions about crime, confidence in policing and police satisfaction

Figure 1 shows the overall ratings for each theme under study across sites, while Figure 2 displays the ratings across waves. Error bars in figures are 95% confidence intervals. Except for awareness of the interventions, there is no immediate evidence that public perceptions experience a relative improvement across waves. Ratings of confidence in policing show that adults, on average, agree with positive judgements about local police legitimacy. Site C, among all sites, reported the highest confidence levels. More than 80% of its respondents agree with statements like *You should do what the police tell you even if you disagree*, *The police act in ways that are consistent with my own ideas about what is right* and *The police can be trusted to make decisions that are right for this neighbourhood*. Notice that although confidence in policing was generally positive in all areas, only about 50% of the sample of each area agree with the judgment *You should do what the police tell you to do, even when you don't like the way they treat you*. Detailed rates of responses to questions pertaining to each theme can be found in Appendix B.
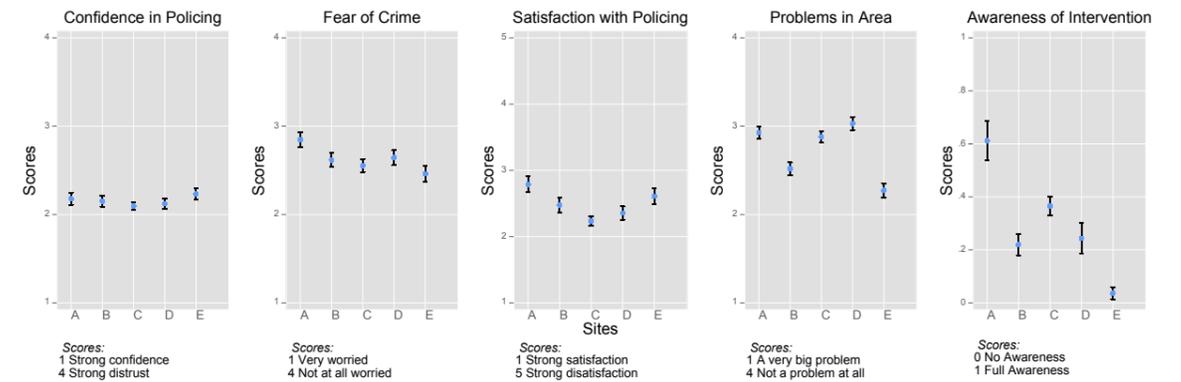

*Figure 1.* Overall scores of perceptions about local policing and crime.
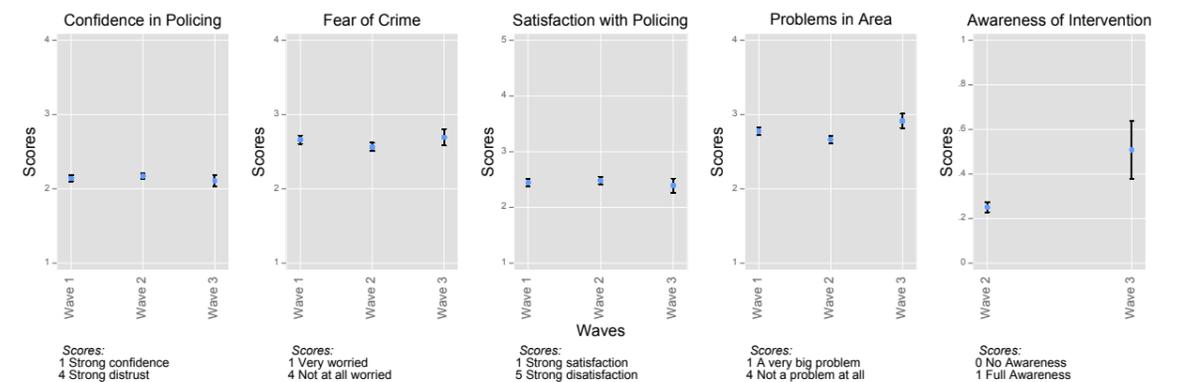
Figure 2. Overall scores of perceptions about local policing and crime across waves

In terms of fear of crime, scores show that people in all areas are on average not very worried to fairly worried about crime (Figure 1, panel 2). The greatest concerns about safety were reported by Site E residents. About 70% of its respondents affirmed being worried about having their home broken into and something stolen, and having their things stolen from outside their home. And more than 60% were worried about being mugged and robbed. In fact, having their home broken into and something stolen appears to be the biggest concern across all areas (excluding Site A), as reported by over 60% of the adults surveyed.

With respect to perceptions of local problems, respondents from Sites A, C and D indicated that problems in their local area are, on average, not very big. However, a common concern raised by more than 50% of them was speeding traffic. On the other hand, problems in Sites E and B are overall perceived as fairly big. In Site B, about 80% of the adults agreed that people using drugs and rubbish lying around are big concerns, and about 50% indicated that people being drunk or rowdy in public places, teenagers hanging around on the streets, and vandalism are other big concerns too. Similar worries were raised in Site B.

Like confidence in policing, overall scores of police satisfaction reflect that people tend to agree with positive judgments regarding police work. Site C's residents report the highest satisfaction rates. More than 60% of them responded that the police understand the issues that affect their community and that the police treat everyone fairly regardless of who they are. A different picture was seen in Sites A and E, where satisfaction, despite being positive, was the lowest. Of particular concern is that 40% of Site E respondents and only 20% of Site A respondents feel that the police can be relied on to be there when they need them. Despite these observed differences across sites, only about 75% believe that the police will treat them with respect if they had to contact them for any reason. When expressing their general assessment, more than 60% of the respondents in Sites B, C and D reported that taking everything into account they do have confidence in the police, and half of the respondents in Sites A and E share the same views.

With regard to awareness of the interventions, the general scores in Figure 1 indicate levels of awareness that are independent of the actual interventions that took place across sites. So the scores inform us about the degree of perceived exposure to any sort of crime-reducing intervention. Site E residents reported the lowest score which is unsurprising given that it served as a control site for the study and therefore no active SmartWater or 'We Don't Buy Crime' intervention took place there, though, as part of the cocooning process, burglary victims received SmartWater kits. On the other hand, the highest awareness level occurred in Site A, where local households received SmartWater packs through a community-led initiative and the intervention was publicised by local media. In Sites B, C and D, awareness was fairly low. Recall that in Sites B and C, the interventions consisted of the distribution of SmartWater kits to properties and the erection of SmartWater street signage while Site D received the 'We Don't Buy Crime' intervention.

Demographic differences

To understand how some underlying characteristics of the residents may influence the degree to which they perceive local problems and trust the police, Figure 3 displays the overall scores of each theme by gender, and Figures 4 and 5 show how the perceptions regarding specific concerns vary across gender and age.
The clearest differences between men and women are reflected in their fear of crime scores. Although there are similar patterns among men and women – they are both most fearful of having their home broken into and something stolen, and of having belongings stolen from outside their home – men's ratings are regularly lower than those of women's. In fact, women reported, on average, 12% more fear than men. The largest differences found are the threats of being raped (25% more fear) and being mugged and robbed (14% more fear) (Figure 4). Also, note that Figure 5 reveals that age differences are not apparent in the data. The only observable (and expected) contrast is the reported fear of having things stolen from their car between residents under 30 years old compared to older residents.

Overall Scores of Confidence and Satisfaction with Policing, Problems in Area, and Awareness of Intervention (by gender)
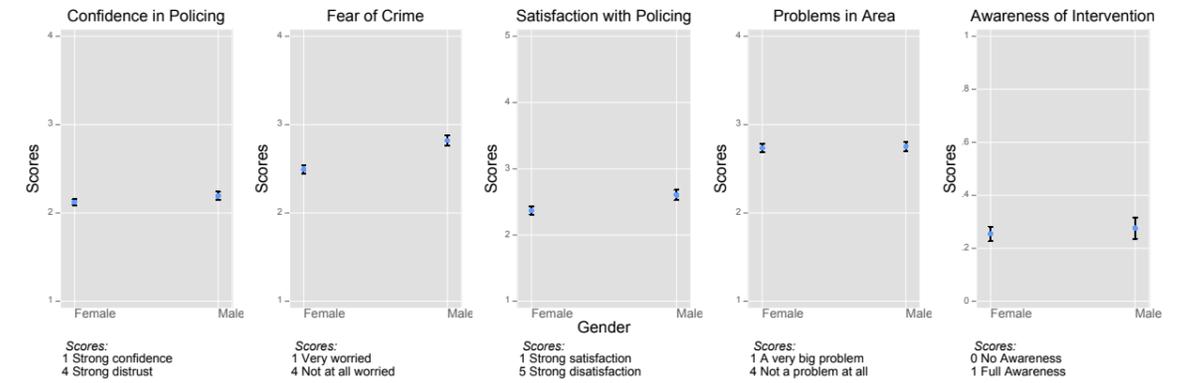
Figure 3. Overall scores of perceptions about local policing and crime across gender groups

Fear of Crime by Gender
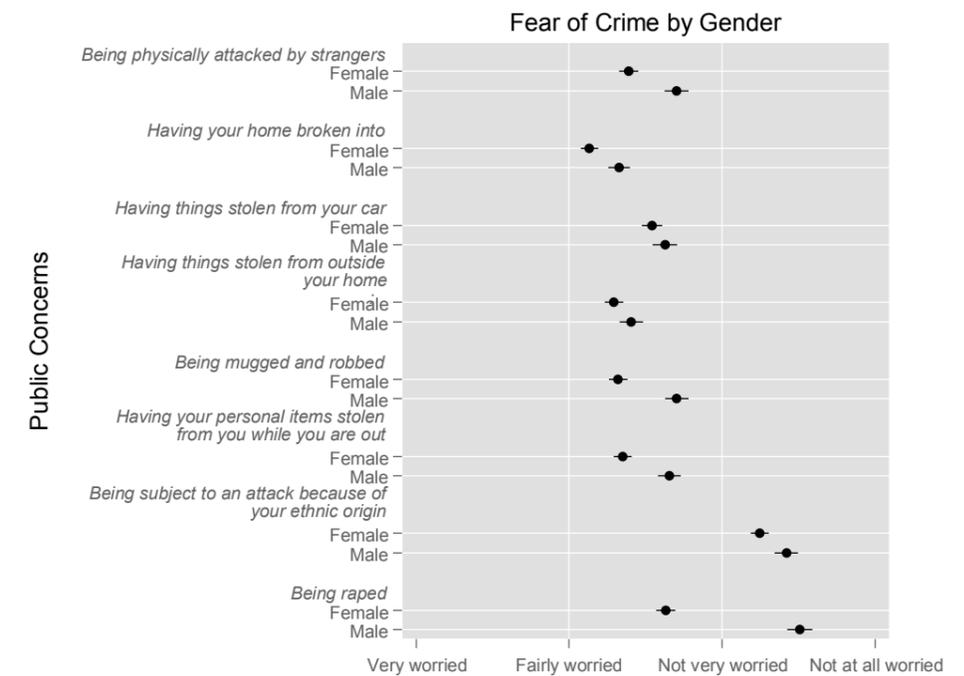
Figure 4. Fear of crime by gender group
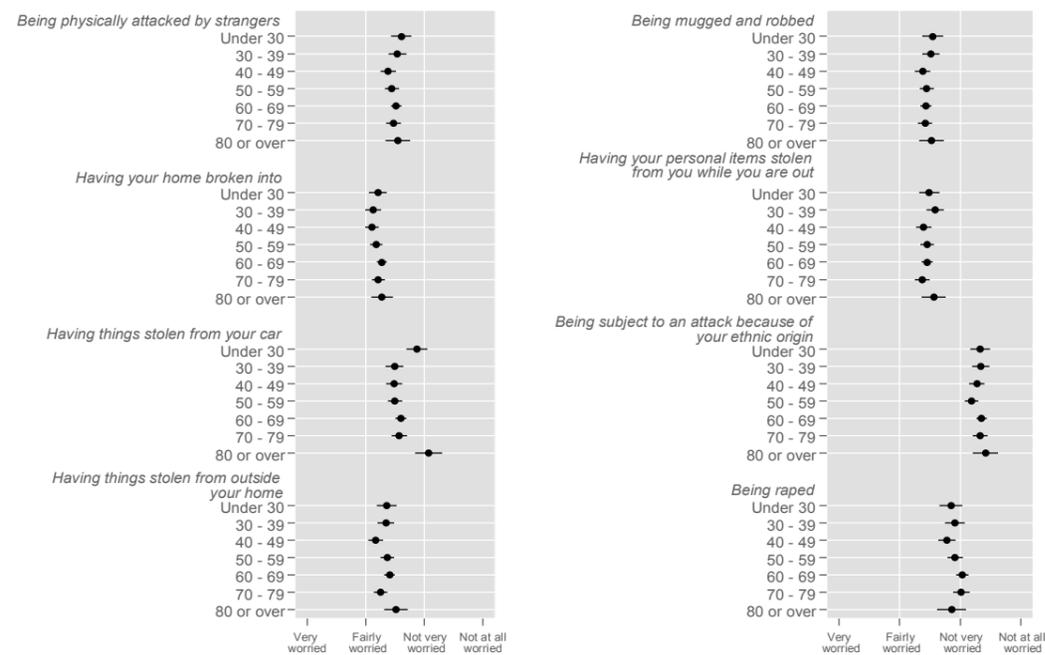
Figure 5. Fear of crime by age group

Effects of local concerns on confidence and satisfaction with policing

To evaluate whether any statistical relation exists between crime (or the feelings of vulnerability to crime) and the levels of confidence with policing, we employed linear regression models. Note that any evidence of significant relations found here (and thereafter) do not imply a direct causal relationship.

Each black point displayed in Figure 6 represents the estimated association between a specific concern and either public confidence in policing (left panel) or satisfaction with policing (right panel). Note that each black point in Figure 6 comes from a different regression model for both confidence in policing and satisfaction with policing. The index used ranged from 0 to 1 (re-scaling the overall scores), and the independent variables were an indicator coded as one when a particular problem was perceived to be at least fairly big (or when the respondent felt at least fairly worry) and a gender indicator. So, all the regressions take into account gender differences and thus consider the fact that women are more likely to feel vulnerable to crime.
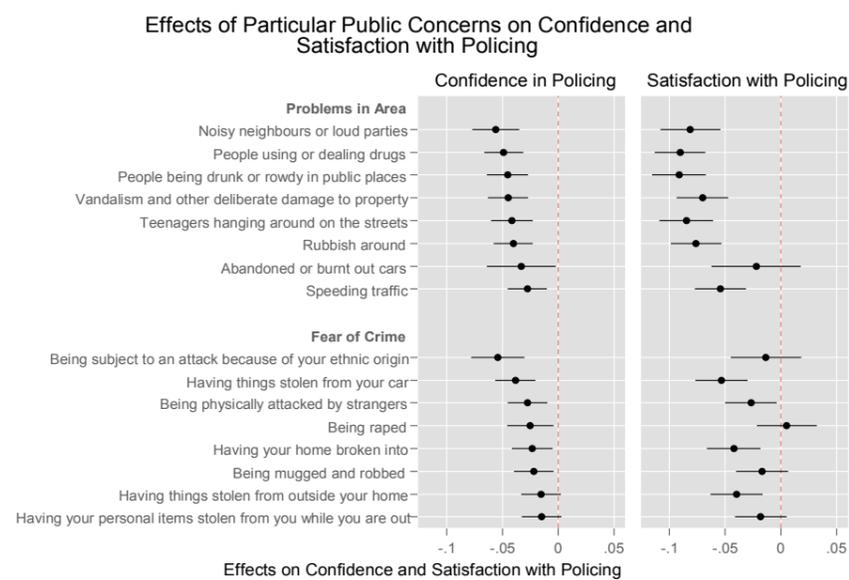

Figure 6. Effects of particular concerns on confidence and satisfaction with policing

The magnitude of the estimates in Figure 6 indicate how a particular concern reduces the 0-to-1 index

of confidence (or satisfaction) with policing. For instance, a resident who expressed that having noisy neighbourhoods and loud parties was at least a fairly big problem would report .05 lower levels of confidence and about .08 lower levels of satisfaction than a resident who had no concerns about this problem.

Note that the different concerns were sorted according to the magnitude of their effect on confidence in policing and so the three most relevant problems associated with low confidence levels are noisy neighbourhoods, people using or dealing drugs and people being drunk in public places. These concerns appear to be important predictors of satisfaction with policing levels too.

Fear about being subject to an attack because of ethnic origin, having things stolen from your car or being physically attacked by strangers are the items that show the highest association with confidence in policing; while having things stolen from your car, having your home broken into and having things stolen from outside your home are the threats that reflect the highest associations with police satisfaction.

Fear of crime and quality of life

Residents were asked to indicate on a 10-point scale how much their quality of life is affected by the fear of crime. Figure 7 reflects the expected extent of the association between specific concerns and the residents' overall quality of life. Estimates come from two regressions — women in the left panel and men in the right panel. The dependent variable was the 10-point score reported by the respondent and the independent variables were eight concern indicators coded as one when the respondent felt at least fairly worried about the concern referred to.
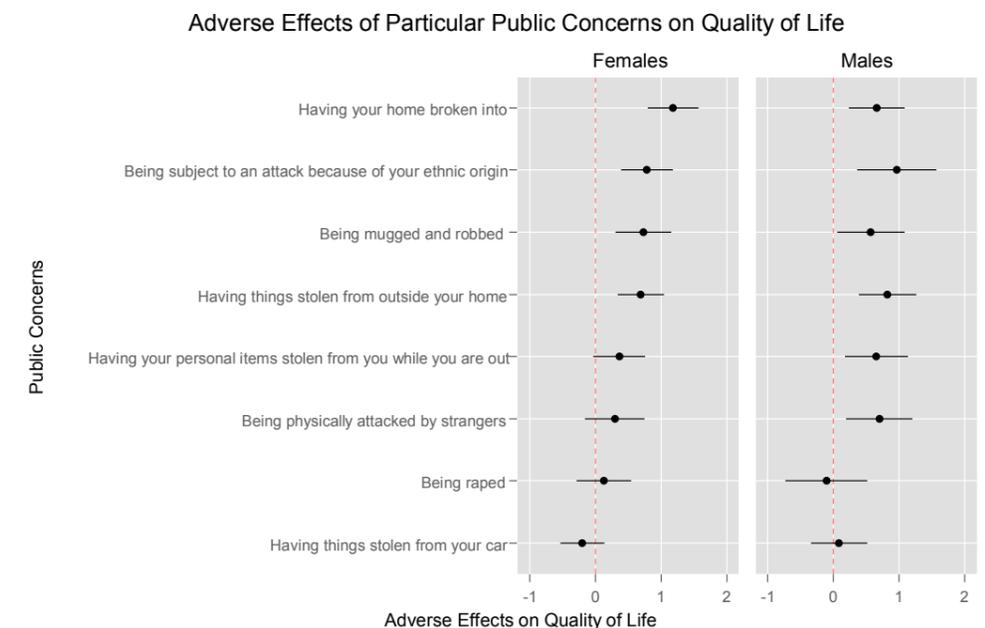
Figure 7. Adverse effects of fear of crime on quality of life

Figure 7 shows that the fear of having your home broken into, being subject to an attack because of skin colour or ethnic origin, and being mugged or robbed are the threats that appear to reduce most women's quality of life, while, for men, all concerns except rape and car crime affect quality of life.

Victim status and confidence and satisfaction with policing

Table 5 displays the distribution of adults who have been a victim of crime across sites. Existing research studies have found that those who come into contact with the police tend to have lower levels of confidence in policing.

Table 5 Distribution of victims of crime across sites by gender group

	Female	Male	Total
E	53	29	82
A	23	26	49
C	56	26	82
D	24	11	35
B	51	37	88
Total	207	129	336

Figure 8 shows, unsurprisingly, that victims of crime are more likely to be fearful of crime and are inclined to report lower confidence and satisfaction with policing. Observe in Figure 9, however, that those who felt that they were treated fairly and with respect are the ones who report higher victim satisfaction levels.
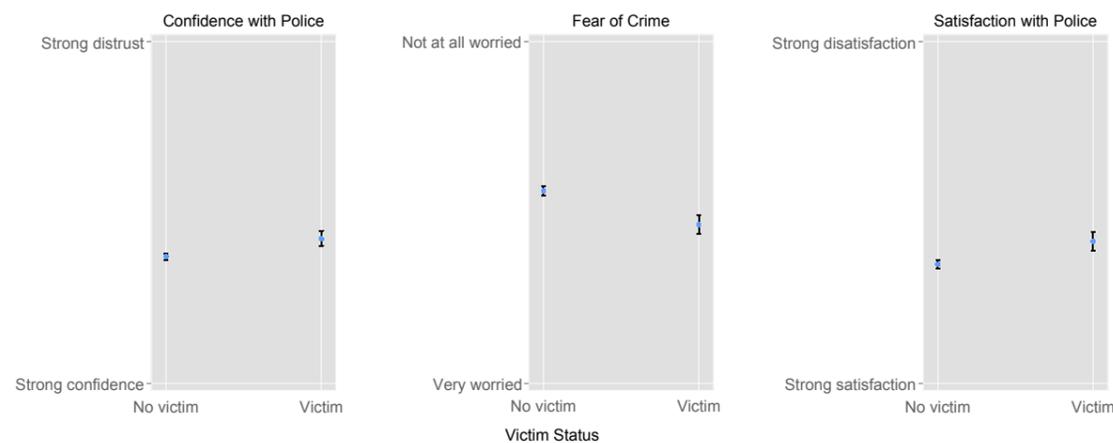
Figure 8. Confidence and Satisfaction with policing by victim status
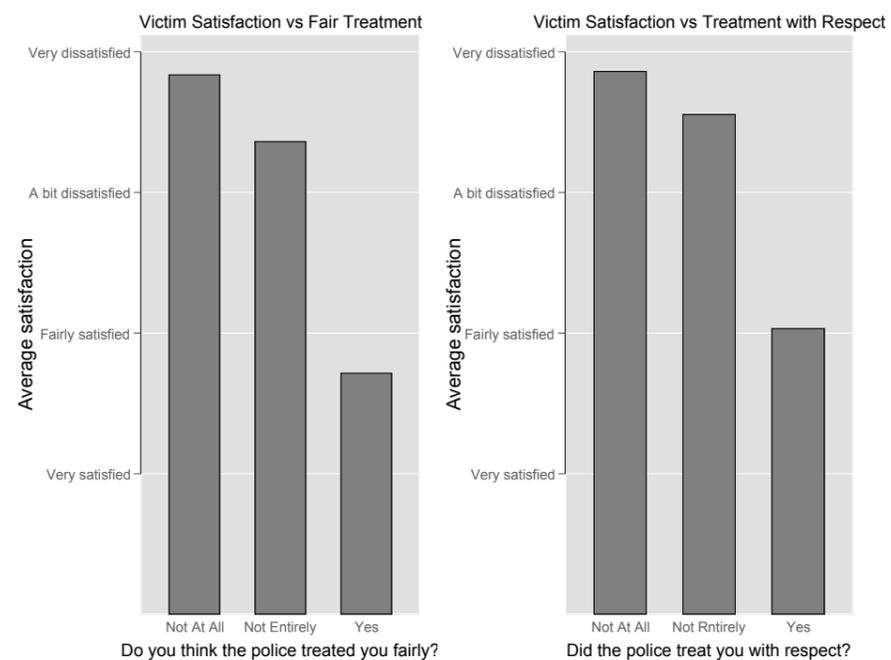
Figure 9. Victim satisfaction vs treatment received

Perceptions of fair treatment are of relevance as they affect police legitimacy. However, fair treatment to victims is not common across all sites, as can be seen in Figure 10. It is concerning that more than 60% of the victims in Site A and about 40% of the victims in Site E reported having received unfair treatment. Notice that Site A had the highest overall dissatisfaction with policing, but the lowest fear of crime (Figure 1).
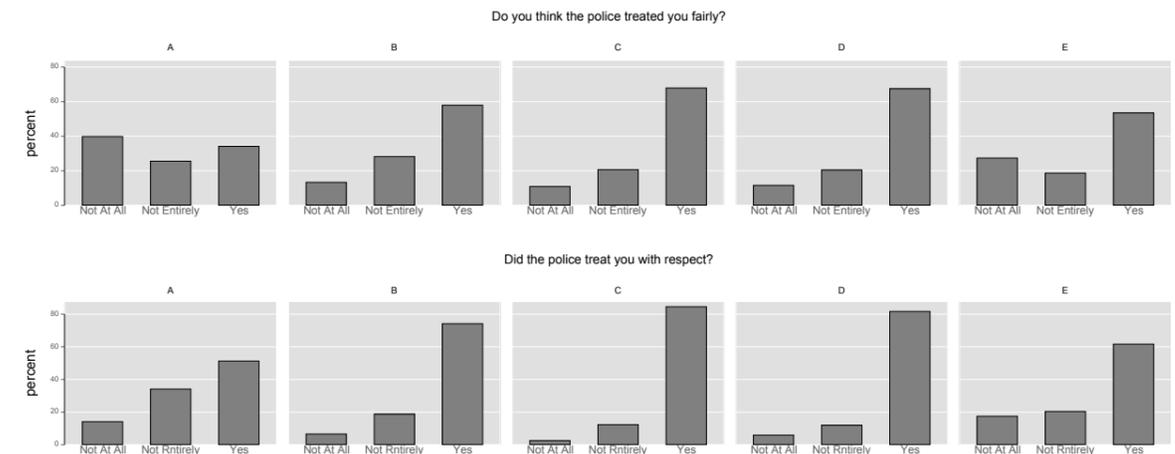
Figure 10. Treatment received by victims across sites

Effects of the interventions on fear of crime, confidence and satisfaction with policing

On the question of which interventions had the highest effects on fear of crime, and confidence and satisfaction with policing, Figure 11 displays the estimates from a range of linear regression models in which the dependent variable was either an index of fear of crime (left panel), an index of confidence in policing (middle panel), or an index of satisfaction with policing (right panel). In each case the index used ranged from 0 to 1 (re-scaling the overall scores), and the independent variable was an indicator coded as one when the respondent was aware of a particular intervention, so each black point displayed in Figure 11 comes from a different regression model and reflects the scale of the relation between an intervention and the dependent variable used.

Observe that there is no statistical evidence that interventions are associated with reduced fear of crime or improved confidence and satisfaction with policing, with the exception of the distribution of free SmartWater packs and crime deterrent stickers to local residents. So people reporting being aware of the SmartWater intervention reported, on average, lower levels of fear of crime and higher levels of confidence and satisfaction with policing.

It is worth noting that when people were asked to indicate which, if any, intervention they were aware of being made in their area, the list of options included one bogus intervention: The Designing out crime campaign. Unsurprisingly, this intervention has the lowest association with the stated levels of fear of crime and confidence with policing but many of the other real interventions, including Smartwater we no more effective than the bogus non-intervention.

Effects of Particular Interventions on Fear of Crime, Confidence and Satisfaction with Policing
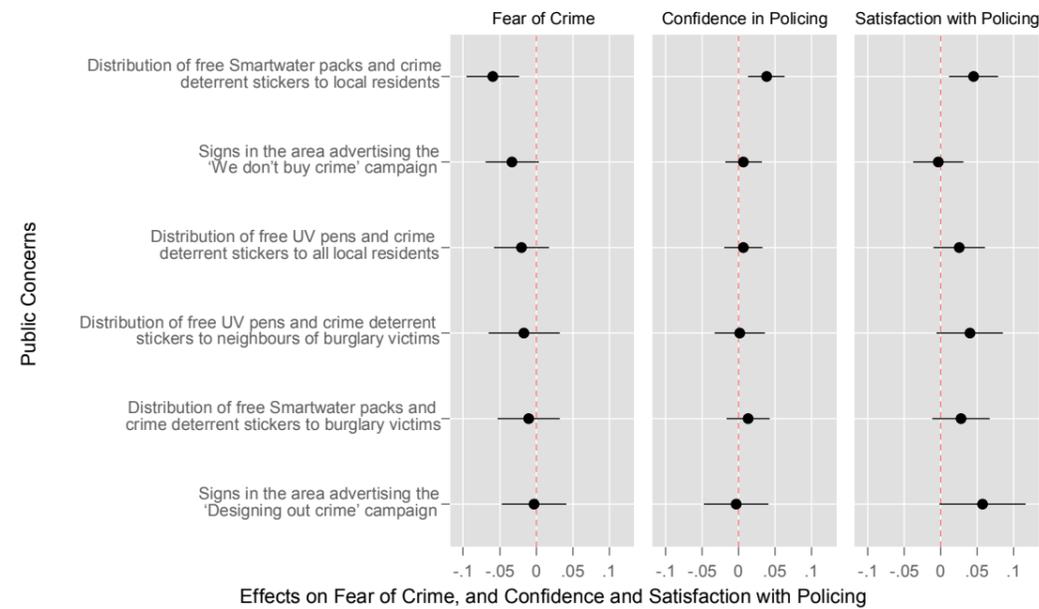
*Figure 11.* Effects of particular interventions on fear of crime, confidence and satisfaction with policing

To shed light on which kinds of problem were perceived as less threatening when the respondent reported being aware of the SmartWater intervention, Figure 12 displays the estimates of a set of regressions that used as a dependent variable an indicator coded as one when the respondent felt at least fairly worried about a particular problem, and as an independent variable another indicator coded as one when the respondent was aware of the SmartWater intervention. From the figure, we can see that those aware of the intervention felt, on average, less fear of being physically attacked by strangers, having their home broken into and something stolen, being mugged and robbed, and being raped. As we have said, this does not mean that distributing Smartwater reduces fear of crime.
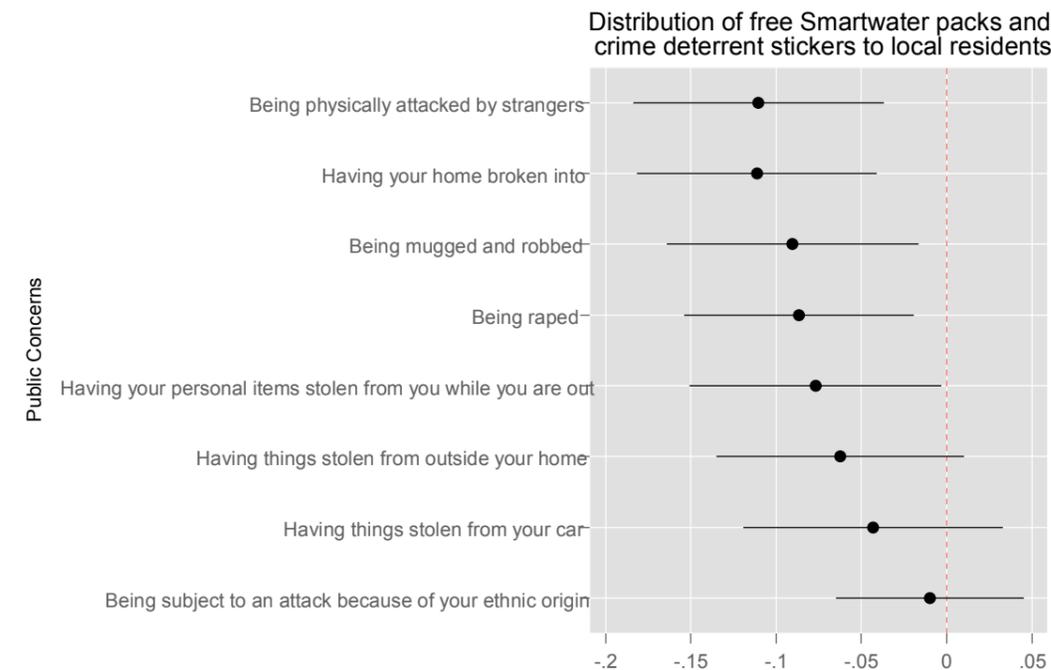
Figure 12. Effects of the distribution of free SmartWater packs and crime deterrent stickers to local residents on fear of crime levels

VII. Qualitative Survey Responses To Confidence In Policing

In addition to the survey questions with fixed answers from which to choose, there were 492 substantive responses to the final survey question *Did we miss something? Use this space to tell us more about crime and policing*.[58] These answers provide further detail about the issues surveyed – some of the underlying factors affecting confidence in and satisfaction with the police, as well as the nature of the criminal and antisocial behaviour problems experienced by residents. In addition, 35 respondents across all sites (with the exception of Site A) used this final question to praise the efforts of local police officers or PCSOs.

Police presence: satisfaction with policing, trust and crime prevention

Existing research literature has noted that public confidence in policing is linked to police effectiveness and engagement, and local levels of disorder. This was also reflected in many of the respondents' comments. In particular, 49% of all comments received mentioned the absence of police presence.[59] Police visibility was considered important to respondents for a number of reasons.

First, some respondents connected the lack of on-site policing with prevention of crime:

> Too little police presence in the area leads to more crime. This is often dismissed as being not serious. This leads to the community not reporting issues as they lose confidence that anyone will deal with it.[60]

> I just think that this area needs more policing/ bobbies on the beat so to speak as there is a lot of unnoticed crimes in the area that people turn a blind eye to and just put up with e.g. people getting drunk in numbers and harassing people. There's a lot of activity by the shops even with all the CCTV and the surrounding flats.[61]

> It would be good to see friendly neighbourhood police walking their beat. This would improve relations with the public and help with the fight against crime. Prevention rather than cure.[62]

In Site A, where 66% of respondents commented on the perceived lack of police presence, some respondents linked the closure of their police station or lack of police presence with the subsequent 'bank robbery' (the theft of an ATM cash machine):

> Our part-time police station is closed and we only have an ineffectual PCSO who walks/cycles around the town/park during the day (to my knowledge) and is not much of a deterrent. ….The bank cash point was stolen during the night using a JCB and the police arrived too late. We are too far away from a manned police station for effective policing of this area.[63]

Recall that Site A residents reported low levels of crime and the lowest fear of crime, but also very low satisfaction with the police and a belief that as victims of crime they had not been well treated. Furthermore, they linked the lack of police presence with their own initiative to equip residents with SmartWater.[64]

> It's the previous Neighbourhood Watch and then local council who initiated the SmartWater not the police. So far the police have been consistent in the inability to turn up when needed...Regrettably if a serious crime occurred which could hurt people I have no faith in the police turning up in time to help….[65]

> Not so long ago, bank cash machine stolen- police took too long to respond. What chance have we when they cannot get here whilst crime is being reported. Well done to parish council who are being active.[66]

Officer A discussed with us the quandary of how to target police resources where they are needed, but also in

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58   These were coded by Site and survey wave (w1, w2, w3) and eight themes were identified: police presence or visibility; dissatisfaction with the handling of crime reported to the police; loss of community policing; positive about the police; specific crimes/problem areas mentioned, e.g. traffic (speeding/parking issues), anti-social behaviour, drunks, drugs, fly tipping, noise, bonfires, dog mess; systemic or policy issues; interventions; fear of crime.
59   Several respondents in Site C commented that the delivery of the SmartWater pack was the first time they had seen an officer in years.
60   A (w1 prior intervention) victim of criminal damage to cars and property reported to police, aged 40+, no 373
61   E (w2 unaware of intervention) victim (unspecified) aged 35-39, no 80
62   C (w1 prior to intervention) no police contact, aged 60-64, no 1394
63   A (w2 aware of intervention) occasionally chats to PCSO, aged 65-69, no 293
64   Interestingly, respondents in Sites B and E, where crime problems were highest, referred to the importance of individual responsibility in keeping safe and protecting personal belongings
65   A (w2 aware of intervention), victim of crime (theft), aged 70-74, no 1262
66   A (w2 aware of intervention) victim of crime (theft), aged 70-74, no 1169

ways that will reassure the public. Officers are more visible in higher crime areas, either in crime response mode or because of other police business, such as servicing domestic violence management plans:

> It's not necessarily that another area is getting a better level of service, it's just that they are the ones with the victims…how much effort do you then have to put into an area where there is no need to respond, to purely increase their public confidence?[67]

This perspective was not generally shared by our respondents. Generally, only a small minority of respondents thought a lack of visible policing was due to low levels of crime:

> Fortunately our neighbourhood hasn't had or I've never heard any crime since I live in this area for 15/16 years. So in this case I haven't seen any police officers around here for a long time.[68]

Second, in addition to its deterrent value, respondents from all areas bemoaned the loss of their relationship with a traditional, community police officer, regularly out patrolling the streets, particularly for their proactive, intelligence gathering capability and ability to build trust within the community, particularly young people:

> Community PC is GREATLY missed. Our old local PC knew everyone/thing in the area, and provided an excellent point of contact. He regularly called to talk/listen to our concerns and gain intelligence on local area.[69]

> Need more police presence before crime is committed… Lived here for 21 years and it WAS nice to see police walking around and being part of the community my children would often talk to the local 'bobby' without fear. No trust now.[70]

In contrast, patrols by car and 4x4 vehicles were seen as a poor alternative to 'beat Bobbies'[71] for the twin reasons that they failed to penetrate certain areas and did not foster a relationship with the local community. This view was particularly noticeable in Sites B and E where large parts of the estates are 'not accessible by car, so it is no good for police driving around the perimeter road in a car and say they are on 'patrol':[72]

> If we could just have one pair of officers walking through the estate on a regular basis, that would help - and I don't just mean walking down the spinal path, I would like to see a patrol walking through as much of the estate as they can, all the little alleys etc. Such a patrol around the estate would help them identify the drug-smoking houses/flats and be able to take action against the people who are making our estate stink.[73]

For respondents from all areas there was also a clear demarcation between police officers and PCSOs. Interestingly the role of the PCSO was considered by some respondents an inferior 'replacement' for a police officer because they 'have no more powers than an ordinary citizen under PACE':[74]

> I understand there are policing cuts but we seem to be seeing only CSO's on the estate and the kids causing the problems taunt them and know their powers to arrest or take charge of situations is limited.[75]

> …more, well any police on the beat would be nice. I think they would be more useful than PCSO's who I'm afraid I think are on the whole a waste of time and money. I would much prefer one policeman instead of two PCSO's.[76]

However, other respondents referred to police officers and police community support officers interchangeably, e.g. 'the police/CSO's should be a lot more strict especially with young people'. Furthermore, another participant noted that:

> Things have improved since we have had community support officers. I have contents insurance but the price goes up every time I claim. I am very satisfied with how police handled my matter and I am telling folks too. The local police in my area are excellent and kind. They deserve good money for the dangerous job they do.[77]

Public confidence in police: treatment of the public
The absence of a visible police presence left some residents feeling that their problems were unimportant:

> Police are so thin on the ground now. We never see a bobby on the beat anymore. They are not interested in any crime other than serious situations like murders or fatal accidents. This leaves the general public to fend for themselves in lesser crimes such as breaking into houses/vehicles and street crime and drug dealing in my road which is so obviously going on.[78]

Lack of police presence was also related to the perception that some areas or people are more worthy of protection than others 'because of where they live' or because the police have better relationships with some families than others.[79] Of all the sites, this perception was most strongly felt in Site E, the control site.

> The police are non-existent on [Site E], there is a massive drugs problem. The attitude of the police is [Site E] is not a nice area, so leave them to get on with it. I have no confidence in the local police or even CSO's. The area is heading towards lawlessness, and the police have no interest. I have no grudge with the police, so when people like myself don't trust them, in my opinion they have lost the battle.[80]

Across all sites some respondents concluded that police viewed some crimes as 'a waste of their time',[81] or that police were permitting or turning a 'blind eye' to crime[82] as a consequence of a perceived lack of police presence:

> In general, the only police officers I see are waiting to stop people committing traffic offences. I do not see police officers walking around this area. This area has two prolific drug dealers, streams of people collecting drugs etc. If I see this, why can't the police see it and stop it? I now have CCTV recording 24/7 because I don't feel particularly safe leaving my home to go to work. It seems to me that more policing time is spent doing paperwork and completing statistical targets for Government etc. They need to be more visible and engaging with the public.[83]

From the total number of comments analysed, 15% of respondents expressed concern about the way that the police dealt with a problem, or repeated problems expressly reported to the police, including lack of action, unwillingness to investigate, or turning up hours after the incident had been reported.[84]Another victim of domestic abuse said that when she had contacted police for help regarding her ex-partner they, 'Treated me bad and insinuated I was still having sex with him!'[85] For some respondents, their negative experiences had adversely impacted on their confidence in policing and their likelihood of reporting further instances:

> I have reported my neighbour of drink driving on several occasions. On two occasions they (police) have come into the street seen he has not got back home and then left knowing that he will return any moment. I feel that it's not worth reporting as nothing is done - unless he ends up killing someone.[86]

> My granddaughter… was approached by a middle aged man on a footpath locally… 8 weeks later we all saw the man again… and I reported the sighting to the police but I was not contacted again and I do not know the outcome. …We have lived here for 5 years and during that time there have been [several serious assaults]…. Nothing has been done….We have no confidence that contacting the police will achieve anything.[87]

Respondents also reported concerns about availability and when and how to contact police:

> Nobody seems to know the times of day or night you can call the police. I called them a few days ago because one house at the back of us is one of those houses with noise, drugs etc etc and they were having parties until 4am in the morning. They said on the phone there are not stated times anymore like it used to be 7am-11pm so what do people do? We don't know what are unreasonable hours.[88]

> Police stations only open sometime and not when you need them.[89]

There was also reluctance on behalf of some respondents to report matters to the police because of a fear of retaliation or the resignation that the police would be unable to deal with the problem because of a lack of resources:

67 Interview Police Officer A.
68 D (w2 unaware of intervention) no police contact, no 75-79, no 1344.
69 E (w1) victim of crime (damage to car) aged 55-59, no 976
70 B (w2 unaware of intervention) victim of crime (theft) but not reported to police, aged 60-64, no 302.
71 E (w2) police contact at community centre, aged 60-64, no 1304
72 B (w2, aware of intervention) no contact with police, aged 65-69, no 1241
73 E (w2) witness to crime, aged 30-34, no 207
74 E (w2), some contact with police, aged 70-74, no 72.
75 B (w1 prior to intervention) witness to crime, aged 45-49, no 876
76 C (w3 aware of intervention) no police contact, aged 45-49, no 1060
77 C (w1 prior to intervention) victim of crime (burglary) aged 70-74, no 88

78 D (w1 prior to intervention) witness to crime, aged 75-79, no 558
79 E (w2) victim of crime (assault) aged 40-44, no 761; E (w3) mother of victim of crime (bullying) aged 40-44, no 242.
80 E (w2) victim of crime (unspecified) aged 50-54, no 98
81 B (w2 unaware of intervention) victim of crime (criminal damage) aged 60-64, no 167
82 D (w2 aware of intervention) parent of victim, aged 55-59, no 543
83 B (w2 aware of intervention) no police contact, aged 55-59, no 1564
84 A (w1) witness to crime, aged 40+, no 1046
85 E (w2) victim of crime (domestic), aged 40-44, no 519
86 C (w2 aware of intervention) victim of crime (verbal abuse) aged 55-59, no 276
87 C (w1 prior to intervention) grandmother of victim of crime (attempted abduction), aged 60-64, no 959
88 C (w2 aware of intervention) witness to crime, aged 45-49, no 1411
89 D (w1 prior to intervention) no police contact, aged 50-54, no 789

…recent domestic in the street involving others I did not report I was worried they turn on me so stayed clear.[90]

There are loud abusive arguments from drink/ drugs usually at 2 am etc. but not something you'd bother police with. Unless it was very dangerous I wouldn't call the police as they wouldn't have the time to come out.[91]

In fact, a number of respondents referred to government policy more generally, e.g. austerity measures or increasing bureaucracy, as having adversely impacted on local police potential to deal with crime:

I think cuts in funding by the government have affected the priorities of the police in my area. They now have too much to do with very little money. All in all they do their best in a bad situation due to financial constraints.[92]

It's not the police themselves fault it is the bureaucrats and their cuts that is turning a lot of mainly city areas into no-go places.[93]

Despite the above, there were also positive comments in relation to specific incidents or individual dealings with the police in all sites, with the exception of Site A:

…we have had many things done to us because of the way I am but each time the police have come out they have been really good with us and put our minds at rest and have been popping in to see if we are all ok and have been around are home and about where we live keeping an eye on things. Police do good job and we always feel they can be trusted.[94]

My community police support officers have been great and I know if I need any help all I have to do is go up to my community centre and they will help me. If not there people there that will pass on my concern and they will come down to my house and help me.[95]

Interventions a positive step
Finally, some respondents used the free text question to comment on the interventions, generally in positive terms. In particular, SmartWater was seen as *'a very good thing':*[96]

Not everyone [in Site B] has had SmartWater but we are aware that some have had it. When is everyone getting it?![97]

One respondent in the control site even requested it:

We live in a new development (retirement house) on an established estate, it would be helpful if police were to issue, as with SmartWater packs, UV pens and any other prevention 'tools' available.[98]

However, respondents who were aware of SmartWater in their area also suggested the need for other interventions that they considered would improve security including better lighting, more activities 'for those who are 'bored' and, most notably, CCTV:

Almost everyone would like to have more CCTV in [Site C]. That will help catch the thieves and stop them stealing.[99]

While the loss of the local youth club in Site B was lamented by one respondent, another based their perception that anti-social behaviour in Site E had reduced in recent years on police *'engaging with young people at local community centre visible on a regular basis'.*[100]

To summarise, for 49% of respondents who gave feedback on their views about crime and policing, confidence in policing related to a strong police presence which was seen by the community as having multiple benefits: deterrent, intelligence, building trust, reducing fear of crime. Though some respondents commented on interventions, including SmartWater specifically, police visibility and perceptions about how police handle crime including specific incidents reported to them, seem to have had a higher profile in the qualitative comments received.

90   B (w2 aware of intervention) victim of crime (burglary) aged 35- 39, no 1566
91   B (w2 aware of intervention) victim of crime (criminal damage), aged 55-59, no 609
92   E (w1) victim of crime (verbal abuse) but not reported to police, aged 40-44, no 168
93   C (w2 aware of intervention) no police contact, aged 65-69, no 1110
94   E (w2) victim of crime (anti-social behaviour) aged 55-59, no 832
95   E (w1) reported incident to police, aged 50-54, no 1282
96   C (w2 aware of intervention) no police contact, aged 75-79, no 630
97   B (w2 aware of intervention), no police contact, aged 50-54, no 1352
98   E (w2) no police contact, aged 75-79, no 344
99   C (w2 aware of intervention) victim of crime (theft) but not reported to the police, aged 40-44, no 541
100   E (w2) no police contact, aged 35-39, no 849

VIII. Thematic Review Of Qualitative Interviews With Police, PCSOs, Community Representative And Offenders

In this section we pick up the key themes once again, but this time based on qualitative semi-structured interviews conducted with two senior police officers involved in the oversight and management of the property marking interventions; seven semi-structured interviews with PCSOs (at least one from each of the five sites);[101] one *unstructured* interview with a community representative from Site A; and four semi-structured interviews with offenders still under the supervision of probation services.[102]

The deterrent value of SmartWater
Both police officers interviewed referred to research suggesting that offenders thought that SmartWater was the most effective deterrent, 'SmartWater came out as number 1' (Officer B), and was well known in the criminal community. However, when offenders were asked, 'What kind of things would deter you from targeting property?' and 'What security feature or gadget has the most impact?' they initially referred to house alarms, window alarms, CCTV, dogs, internally beaded windows, cars on the drive and even the 'lay of the land' but none independently mentioned stickers or signage, or SmartWater specifically – including the offender who had previously been caught with SmartWater on them (Offender 3). However, when directly asked, all four offenders interviewed said that they had heard of SmartWater.

It was also assumed to be effective as a deterrent by police and PCSOs because burglars 'don't want to be caught' (Officer B). However, two of the four offenders interviewed suggested that their offending was driven by alcohol or drug dependency and therefore they were less concerned about security interventions:

…obviously when I was on drugs before and that, nothing would really deter me… you don't think about things, all you're thinking about is getting money to get more… (Offender 1)

When I've been arrested I've been tested for it at police stations before and it's been found to be on my person. But with me it wasn't… a deterrent. I wasn't like 'I'm not going to do it because of this…I didn't care about the repercussions…because I didn't care if I got caught or not. (Offender 3)

Indeed, Offender 3 said that they were in such a destructive cycle of offending that they wanted to get caught:

You might think I'm a bit mad now when I tell you this, but I used to cut myself deliberately so the police would know it was me…so somebody with that mentality is not going to care about what SmartWater … (Offender 3)

In fact, one Probation Officer suggested that the criminological need of all of the prolific offenders under his supervision was treatment for alcohol or drug dependency and that none of them were particularly motivated by security interventions. However, the Site B PCSO also suggested that there were two types of burglar:

So you've got the ones that are doing it for their drugs or alcohol, they're the ones that aren't going to be calculated, they're the sloppy burglars who are probably caught very easy. But you've got to think about the ones that do it for trade, to order, they do it, they sell, nothing to do with a dependency for drugs or alcohol, purely for cash. They're the ones that are thinking outside the box, it's almost like a business …They're the ones that are going to do their research and understand SmartWater and research alarm systems. (PCSO Site B)

Part of the SmartWater system requires that the chemical is detectable. Officers A and B reported that all officers now have torches to detect property marking while conducting stop and search, UV arches in the custody suites and items of property are checked for SmartWater in the custody suite. The police have signed up all the second-hand property stores in the area to adhere to best practice on property marking and property alerts get sent out to all the stores on the database requesting them to be vigilant regarding certain items of stolen property (Police Officer A). Antique, pawn and second-hand shops have UV lights to detect for property marking (PCSO Site A). One PCSO suggested that:

101   Interviews were conducted with two PCSOs from Site C, two PCSOs from Site D and one PCSO from each of the other 3 sites A, B and E.
102   Offenders 1 and 2 were from outside Telford; offenders 3 and 4 from within the research areas.

…a lot of burglars…they know that if property is SmartWatered they can't walk into your pawn shops and stuff like that where they give you cash for your possessions because they check for SmartWater and they know that it will be identified. So it's very difficult to send on property that is SmartWatered. (PCSO Site E)

However, the probation officer in Telford suggested that prolific offenders evade detection by selling stolen goods on at very low value to other people, who are aware that the goods are stolen, rather than second-hand shops.

Compared to the UV pen, the police officers interviewed were confident that SmartWater could not be removed without damaging the article and reducing the value of the goods (Officer B) and considered its effect to be long-lasting – Officer A gave an example of an item of equipment that was stolen yet recovered 15 years later and still retained the SmartWater mark.

However, some offenders and one PCSO suggested that it may be possible to remove SmartWater from goods or clothing by using nail varnish remover (PCSO Site B) or by changing their clothes (Offender 2):

…if they've got cameras and that there's no denying it's you because you're there it's on CCTV. SmartWater I suppose you can get it off, I don't know if that's true or not you know. (Offender 1)

While SmartWater property marking dries instantly and may be contrasted with industrial SmartWater that sprays the offender, 'there have been certain cases where someone's got a bit under their fingernail or a bit of dust' (PCSO Site B). The PCSO interviewed from Site B suggested that:

I'm seeing stickers on people's doors that are still getting burgled because all SmartWater will do, and people know this, is identify the property back to the owner, it doesn't mean someone is getting caught because if they're not caught with SmartWater on them then there's no way we can prosecute them for it. And they are quite aware of getting SmartWater off, it's a tiny little dot on the back that people use, they can use a UV light to find it and they'll probably find some sort of solvent to get rid of it. So we are still having them…

Furthermore, the PCSOs interviewed from Site B said that there was a culture of buying and selling in the area, 'people will quite happily sell their TV to the neighbour or sell their computer games on and all these things that they could possibly could have marked.' Therefore, it was difficult to keep track of whether someone legitimately owned an item of marked property: 'that item is assigned to a certain property but by the time we come to finding it, it could be seven people on…That has happened' (PCSO Site B). Indeed, Officer A confirmed that they had arrested a suspect for theft of a power tool on the basis of SmartWater only to find out later that the tool had legitimately changed hands.

The PCSO interviewed from Site B was also concerned that SmartWater may be abused by 'vindictive people' who may use it to 'claim money back', '[f]or instance, sell someone the television and then claim its been stolen, give us the person who they think has it, we find the property, return it to them but then they've got the money and the television back' (PCSO Site B). The same PCSO also suggested that people may be selling the vials, 'rumour was spreading that they were worth £50-£70 so my worry was that they were not actually marking anything up with it which could have caused a whole load of problems' (PCSO Site B).

One PCSO also questioned whether the deterrent effect of SmartWater would be transient:

…as a deterrent SmartWater stickers on the premises is a good thing and hopefully the would-be villains will see these and be deterred by these but I suppose as time goes on and people move out and things change and get used to the idea and will just continue regardless. (PCSO 1 Site C)

Implementation of intervention
Implementing the interventions is labour intensive, not merely to cover the area: 'Dropping off packs is not enough' (Officer A), it was necessary to spend time with residents to explain the intervention and to put the stickers up at the front and back of the house. This could take up to 30 minutes per property. The PCSO in Site B only went to privately owned or rented houses and decided not to deliver to houses of multiple occupancy, believing that residents moved on too quickly to merit the investment of time and even that some burglars lived there.

Using the community to help administer the packs was more efficient since it was 'much more labour intensive getting PCSOs to try to engage' (Officer A). In Site A up to 20 volunteers assisted PCSOs so that within two weeks contact had been made with 1400 homes (Officer A). A team of one PCSO and between three to four volunteers were able to visit an entire street in one hour (Officer B). The volunteers could then go back without PCSO supervision to do the 'mopping up exercise' – 'sometimes you visit a property two or three times and there's no one in so you need to make sure that they've had their SmartWater kit' (Officer B). However, one PCSO in Site D said that they had received 'no response' from the 'vast majority of people' and therefore 'would just leave the stuff on the post box'.

In contrast, the areas which were funded and 'driven' by police (Sites B, C and D) only had one or two PCSOs covering the entire area, sometimes conducting 'multiple visits' to the same address (PCSOs 1 and 2 Site C) which was time-consuming and put a strain on resources – 'who's doing their day job?' (Officer A). PCSO 1 Site C put it in this way:

Now it's in place it's a good thing because obviously it deters crime and helps protect the community, at the time we were doing the delivery it took a huge amount of staffing hours which took us away from our normal role so it meant that other jobs were possibly put on the backburner.

Furthermore, it may also be necessary to 'pull officers in' from other areas to complete the task (Officer B) which is what happened in Site D and even in Site A, despite the team of volunteers according to the PCSOs in those areas. However, where there were greater numbers of people involved there were also inconsistencies with the way that the intervention was delivered, e.g. 'some houses with the stickers up, some streets without them' (Officer A). In addition, there were problems obtaining permission and additional funding for the erection of signage, since the local authority had outsourced their traffic teams. Therefore, the signage, which is arguably the 'biggest deterrent' (Officer B) was often delayed and therefore the last aspect of the intervention to be completed. Though police estimated it took 2-3 months to roll out SmartWater, the two PCSOs interviewed from Site C both stated that it took four months to fully implement in that area.

One drawback of marking with SmartWater chemical, compared with the manual, traditional UV pen, is that it requires the householder to register their vial of SmartWater before it may be traced back to their property. PCSOs got round this problem by registering the vials and filling out the forms on behalf of residents on the doorstep while handing out the SmartWater packs and then delivering the completed forms to SmartWater (PCSO Site A, PCSO Site B, PCSO 2 Site C).[103] PCSO Site B reported taking 50-60 forms to SmartWater's offices each day. However, even this system still relies on residents marking their property with SmartWater to be effective:

…it's only ever as good as the people who are putting it on so you know if they just say thank you for the package and don't bother to use it and then a crime occurs it's likely the property won't have been marked. (PCSO 1 Site C)

…we were delivering SmartWater to a lot of elderly people that were getting really confused by it, we were trying to tell them how to do it at the time but I'm not even sure if 50% of the SmartWater kits we gave out were marked up. (PCSO Site B)

Crime rate
Police suggested that there had been a 'significant' reduction in burglary in Sites A and C – both SmartWater sites - since the interventions:

Site C stats have come in and had some significant reductions in burglary there which we haven't seen for two decades – it's a high crime area and I haven't got any more resources or done anything different in that area, so whether that continues or there will be a drop off after 12 months I don't know.' (Officer A)

'We still haven't had a burglary dwelling since we did the intervention 14 months ago and [Site A] averaged 15-20 burglaries a year before that. That's a significant reduction and as time goes on we will see what happens. CM's different from everywhere else. (Officer A)

However, as the above quotes suggest, there were concerns about the longevity and general applicability of the intervention; Site A is seen as something of a special case since it was the first area to receive SmartWater in November 2015 (and has a more pro-active, affluent community) whereas Sites B and C were not completed until August 2016 (Officer B):

It looks on paper as if they've been successful but obviously we've only been going a short period of time and I think we really need to look at a more lengthy period… to see if it has a long lasting effect. (Officer B)

PCSOs in Sites A, B and C also noticed a decline in domestic burglary by virtue of the fact that reassurance burglary visits to victims of burglary seemed to have decreased (PCSO Site A, PCSO 2 Site C, PCSO Site B) although not completely eradicated (PCSO Site B).

Since November 2015, West Mercia and Warwickshire Police have introduced SmartWater to 12 areas across two counties at various junctures (including the three areas that are the subject of this project). Police Officer A suggested generally that:

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103   However, rather than attempt 'multiple visits' PCSOs in Site D would put the packs through the door if people were not in and therefore would not have registered them on their behalf (PCSO Site D).

This time last year we'd had 588 burglaries in Telford, and for this 12 months I think we have had approximately 380, that's nearly 200 less burglaries, that's a big chunk of time. So actually, I have noticed it having worked in and around Telford for some time, that my proactive team who traditionally would have spent most of their time looking at burglaries, they're doing a lot more around drug offences and other high harm areas such as domestic violence… (Officer A)

Police Officer B tentatively commented that all 12 SmartWater areas had shown a 'comprehensive' decrease in burglaries. Although Site C had seen the smallest reduction in domestic burglaries, this was still a 30% decrease: 'And if I can explain that as being a worse performer, it's obviously a good indication that something… in the environment has changed' (Officer B). Officer B also noted the significance of this reduction, given the national trend of increasing rates for burglary. Officer B also suggested that initial findings in crime statistics suggest that the most significant reduction in domestic burglary was in the rural SmartWater areas, compared with 'inner-city' areas such as Sites B and C that are 'very close; there's no boundary as such.'
For example, in relation to another rural area which was completed in January 2016 but not part of the immediate study, 'there was a run of thee months previously of 17 burglaries and that went down to one by April 2016…Very interestingly it was one of the residents that declined the offer of the free SmartWater.' (Officer B) However, both police officers also questioned whether it was the intervention directly, indirectly or other factors that may account for the apparent decline in the numbers of domestic burglaries since SmartWater was rolled out. For example, it may also be attributed to greater levels of awareness and precaution exercised among residents as a result of having 'gone and spoken to them all' about crime prevention (Officers A and B). It may also be as a result of spikes and dips in burglaries as a result of habitual offenders having been caught and then subsequently released: 'you go through that cycle of we know who our burglars are, we lock them up, they go to prison for a bit and they come back out and you just hope you don't have all of your prolific offenders in the community at the same time' (Officer A). Officer B also suggested that increased PCSO visibility during the 2-3 months it took each site to implement the intervention may also have contributed to the deterrent effect in the short-term.

Public confidence: interventions, visibility and role of policing

On the whole, the PCSOs delivering SmartWater[104] were positive about the intervention's impact on public confidence in policing. Victims of burglary who were visited and offered SmartWater found it 'very reassuring' and the police project manager for the intervention had been approached by other villages and towns regarding SmartWater (PCSOs Sites A and E). Some PCSOs' comments included:

It's been received very well by the public, they've all been very grateful and didn't know the item was out there and accessible to the public, it was just something that business and shops had. (PCSO 1 Site C)

…it's been a very positive intervention that's taken place and if you walk around Site C you'll see most of the SmartWater stickers in people windows. (PCSO 2 Site C)

…we can't be everywhere all the time, and it does make them feel generally safer that they've got something in the house that they can put on their products and a sticker in the window. It just gives them a bit of, a sense of safety… (PCSO Site B)

PCSO 2 Site C elaborated on why the 'minority' decided not to take part:

Some of the elderly didn't understand what it was all about and didn't see the need for it. Other people's excuses were they've already got house insurance and other people just didn't think they were going to get burgled and didn't see the need for it. (PCSO 2 Site C)

In contrast, both PCSOs interviewed from Site D that were delivering the 'We don't buy crime' packs were less enthusiastic about the intervention's impact on confidence in police-community relations. One PCSO didn't consider the intervention to be particularly relevant to their area: 'the issues that most people seem to be raising with us at the moment are ones that SmartWater would have no effect on' (PCSO 1 Site D). The other thought that views on the police were fixed:

…there are some people who like the police and want to speak to them and some people dislike the police and don't want to speak to them, I don't think that's changed; that's just the nature of the beast in my job. (PCSO 2 Site D)

The community representative from Site A thought that although the intervention in their area had resulted in an increase in public confidence in policing, the nature of the intervention was not necessarily important; it was the

104   PCSO Site A, PCSO 1 Site C, PCSO 2 Site C, PCSO Site B.

fact that the police were trying to help. Indeed, they suggested that the efforts and information sharing needed to be sustained so that the public were aware that the police were doing their best.

The interviews also revealed a number of indirect consequences that may not be immediately associated with the interventions' primary purpose. For example,

We've had lots of positive feedback at the time and lots of positive feedback since the interventions eg house insurance premiums have gone down. (Officer A)

The interventions were seen not just as a possible deterrent but also as an opportunity for public engagement and a means of rebuilding relationships with the police. Site A is an exceptional example in that the intervention was planned and organised by the Crime Reduction Group, comprising police, local councillors and residents all working together to improve morale in policing after the closure of the local police station (Community Representative for Site A). Police involvement in setting up the Crime Reduction Group, 'pointing out' SmartWater to residents and providing support in rolling out the intervention was seen as pivotal to 'increasing people's perception of the police' (Community Representative for Site A):

Just that visibility that the police were actively trying to do what they could with the resources that they've got. I don't think it's their fault. …I mean now everybody knows that the police were round here, they know that they were helping. They know about the Crime Reduction Group…' (Community Representative for Site A)

Furthermore, in the other three areas where PCSOs worked alone, it improved relations with the community:

…it's improved the public awareness of the PCSO role, some of the things we do and don't do and it's engaged a conversation… it's got us in through a lot more doors than just walking the streets would have done. (PCSO 1 Site C)

It's been a great way of getting to know each and every member of the public in that area. Obviously you're knocking on their doors and you're speaking to them so its broken down that barrier so people can approach you with in the streets so its been a great way to get your face known really within the area. (PCSO 2 Site C)

It gets us out speaking to the community, members of the public that might not stop and speak to me in the street, I'm actually physically knocking on their door to make them aware something's happened which gets a relationship between me and them… And that is our main priority to engage with our community and I know a lot of people on Site E don't really like to engage with the police… But if I'm knocking on their door to tell them something's happened that's the perfect opportunity for them If they feel they want to speak to a PCSO then they can. So it just pulls everything together really, we're giving advice, reassurance and we're engaging with our community. (PCSO Site E – delivering SmartWater as part of the cocooning initiative)

However, despite the insistence of the Community Representative that the intervention in Site A was very much a partnership between the police and the local community, the extent to which the positive effects of the intervention would be accredited to the police in Site A, as opposed to the parish council, by local residents was also raised by the police:

…there are some positive things but I don't know how much of the interventions they associate with us and how much with the parish council because they funded the CM one. (Officer A)

The link between preventative policing or 'visibility' and levels of public confidence in policing was also apparent in the interviews with police. Across the five sites, Officer A discussed the problem of managing 'different expectations' regarding police visibility, particularly in Site A which is a low crime, rural area:

We deploy officers where incidents are, our highest harm areas, where we need to do preventative work… So it's about how we are managing those expectation levels where there is reduced policing presence and I don't think a) there is a simple solution and B) that currently we are doing that very well. But how much time do you and can you invest in an area where you don't have many problems?

In respect of the dissatisfaction regarding the police response to the ATM robbery in Site A, the police suggested that particular incident, 'probably lives on much longer in the memory' (Officer A) because there were lower rates of crime in that area.

In contrast, Officer A considered that the other sites, '*see police on a daily basis in their area, whether it's a car attending to go and see a victim, or patrols, or servicing domestic violence risk management plans.*' Yet, the

survey comments reveal that police visibility is the most prevalent concern among all five sites, not merely Site A, so it is possible that the police have overestimated the 'different expectations… around visibility' between the sites.

Officer B suggested that the intervention in some way was an attempt to address the lack of visibility by trying to help people feel safer in other ways:

> You know they don't see a police officer in their street every day, I don't think they expect that now but we try to do something…to combat… one of the most important crimes for them – burglary. ….we're trying to do something that makes them feel safe [and] is well received by them. (Officer B)

Interestingly, the pro-active, community participation model adopted in Site A is now being considered by the parish council in Site E who are also looking into trying to part-fund SmartWater, working with police and local charity at the suggestion of their PCSO (PCSO Site E). Furthermore, since the SmartWater intervention the Crime Reduction Group in Site A has gone on to fund other interventions, including sourcing and fitting 12 CCTV cameras as a deterrent.

> …whereas before you always saw, we used to have a policeman who lived in the village…and we used to have the police station there so he was always about. And you'll never get back to that… And yes people want it back how it was but we are where we are. And the only way to do it is through volunteers. You know we've got CCTV now that's recording 24/7… and we're getting another 12. And then that gives people confidence… (Community Representative for Site A)

The potential impact of collaboration with volunteers is also recognised by police who, as a result of the intervention, see volunteer involvement as a step forward in providing more pro-active, preventative policing and managing scarce resources:

> What we're looking to do now is… getting pools of volunteers in to assist us with tackling certain issues. So one of the things we're looking at is CCTV… we want to set up a viewing studio at the police station but we want volunteers to come in and view it at times of peak demand. So yes hopefully this time next year I will have a pool of volunteer resources which will allow me to say, right we're looking at doing this intervention in wherever it may be and I can import volunteers in from elsewhere to assist. So absolutely it's one thing I've learnt from this is that the volunteer aspect, including police cadets and special constables is more persuasive and much more effective because we don't have a huge level of resource. (Officer A)

When questioned about the changing nature of security and policing and whether private security interventions were supplementing policing, one PCSO suggested:

> … with the cuts we have seen, policing is getting so much harder, we are literally inundated with work. It's so much harder to give people constant time that they need. To have something under our belts to say this is not just a quick fix it's a fantastic fix, you know, it enables us to be out there basically doing other things as well as reassure. And passing over that sort of mantle to SmartWater but obviously still feeding through the police, would make our jobs much easier because we can't cope with the massive amount of jobs coming in constantly. Because it's not just burglary that we deal with remember, its hundreds of other jobs that everybody needs a piece of the police team now. If you think geographically of the size of my patch, it's vast and I mean huge, I have to drive it's so far to get to the other end and it's not just rural countryside its literally towns so I can't, there's only 3 of us and 1 police officer, I can't literally be everywhere at once. (PCSO Site B).

IX. Recorded Crime Figures: Evaluation of the Effect of the Interventions

Overview

In this part, we consider two data sets: Section 1 considers the crime rates for burglary of a dwelling and burglary of a non-dwelling in the four sites, A-D, after the implementation of forensic property marking interventions; and Section 2 analyses the crime rates for burglary of a dwelling and burglary of a non-dwelling across 14 treated sites (including sites A-D).

Since 2015, West Mercia Police have developed interventions across 53 other locations, in addition to the four targeted sites of this study (a total of 57 sites), which are at various stages of completion and which police officers and PCSOs also alluded to in interview. In view of the low numbers of burglary reported in sites A-D during this study, we decided to increase statistical power by combining crime rates for domestic and non-domestic burglary in the other treated areas. Therefore, crime data from 10 additional areas in West Mercia *that were completed at the time of the study and for which crime data were available* were considered alongside the four treated sites A-D and formed the basis of our analysis in Section 2.[1] The purpose of our analysis was to determine whether in [1] sites A-D and [2] in the 14 treated sites (including A-D), there was any reduction in crime rates in treated areas post-intervention compared to non-treated areas.

For our analysis of crime rates, West Mercia Police provided data on all crimes reported to them between January 2012- July 2017. The data included date, time, location, and nature of the crime. Figure 13, Panel A, displays crime events recorded during the last six years across all West Mercia Police's force area and highlights in green those crime events that took place in any of the other 53 locations with interventions. Figure 13, Panel B, zooms into Shropshire county and displays crime events recorded throughout the five treated sites under study and the remaining area of Shropshire county.

Given the nature of the interventions, the evaluation focuses on quantifying changes in crime rates of *burglary in dwelling* and *burglary in non-dwelling*[2]. Table 6 describes the offences included in each of these categories.

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1   Of these 10 other sites, the earliest intervention was completed in October 2015 and the latest intervention was completed in May 2017.
2   Under the possibility that crime could have migrated to other forms different from burglary or could have migrated geographically to areas adjacent to the treated ones, we also explore changes in crime rates across three buffers bordering each site: 0 to 300 meters from the border, 300 to 600 meters and 600 to 900 meters. However, given the sporadic occurrence of crime events in these areas, no significant differences in crime rates were detected.
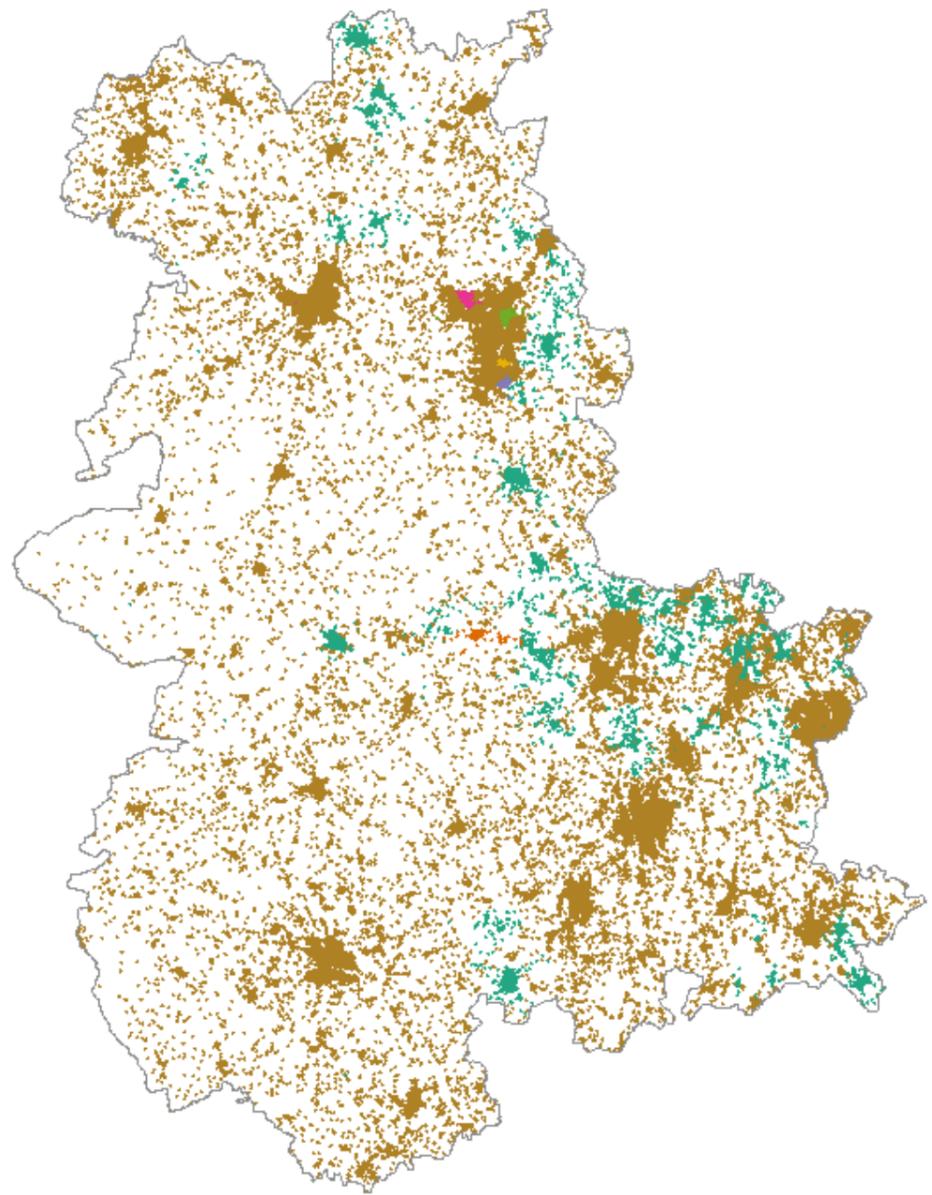
Figure 13. Police Interventions across West Mercia Police Area.
A. West Mercia Police Area – Crime Events during 2012-2017
All crime events recorded during the period 2012-2017 across the police force area. Green points highlight crimes that occurred in sites with interventions pending, in progress or completed while brown points highlight crimes in sites without interventions.

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■	Treated Site A - SmartWater
■	Treated Site B - SmartWater
■	Treated Site C - SmartWater
■	Treated Site D - WDBC
■	Treated Site E - Control
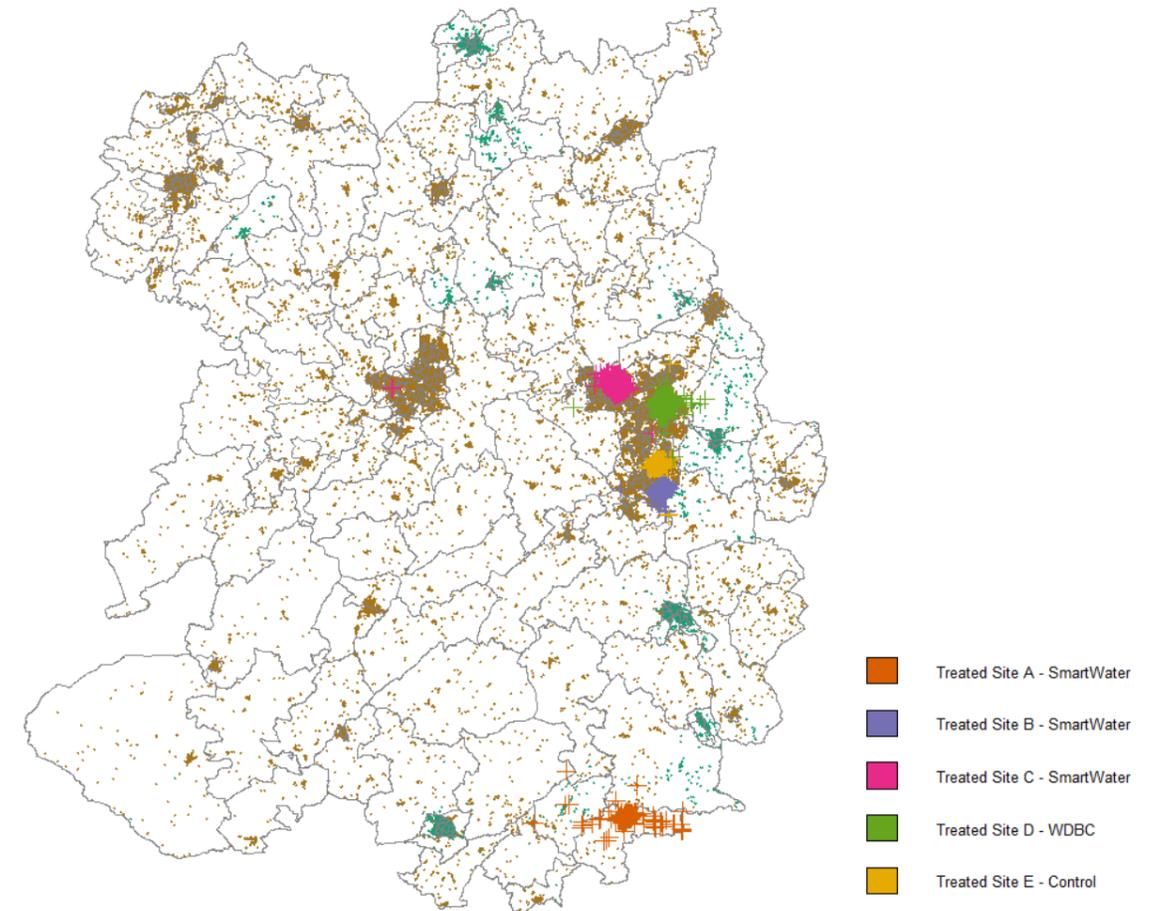
Figure 13. Police Interventions across West Mercia Police Area.
B. Target Sites across Shropshire County – Crime Events during 2012-2017
The five target sites under study located in the county of Shropshire: Sites A, B and C (commercial sites), Site D (own-brand site) and Site E (control site). Target sites have been scaled to increase their visibility.

Table 6. Offence description for burglary in dwelling and burglary in non-dwelling.

Burglary type	Offence description
Burglary Dwelling	Burglary dwelling, theft / attempt theft with violence
	Burglary residential dwelling
	Attempt burglary dwelling with intent to steal
	Burglary dwelling, theft/attempt theft with no violence
	Burglary dwelling with intent to inflict grievous bodily harm
	Burglary dwelling with intent to steal
	Burglary dwelling with intent to damage
	Conspire to commit a burglary dwelling with intent to steal
	Attempted burglary residential dwelling
	Attempt burglary dwelling with intent to damage
	Attempt burglary dwelling with intent to inflict grievous bodily harm
	Burglary other than dwelling, theft
Burglary Non-Dwelling	Burglary residential non-dwelling
	Attempt burglary not dwelling with intent to damage
	Attempt burglary not dwelling with intent to steal
	Burglary business and community
	Burglary not dwelling with intent to damage
	Attempted burglary residential non-dwelling
	Burglary other than dwelling, theft / attempt theft with violence
	Burglary not dwelling with intent to steal
	Attempt burglary not dwelling with intent to inflict grievous bodily harm
	Conspiracy to commit burglary residential non-dwelling
	Attempted burglary business and community

1. Impact Evaluation of the Interventions in Sites A-E

In this section, what follows is:
(i) an impact evaluation of the interventions for each of the five sites in our study, and
(ii) an overall impact evaluation for sites B, C and D, where interventions were implemented at the same time and therefore have identical the test periods

How We Conducted Our Analysis
To identify the average treatment effects of each intervention, i.e. to see whether there was any difference between the crime rate in a treated site compared to the crime rate in the same site if it were untreated, we did not simply compare crime rate of burglary of a dwelling and non-dwelling before and after the interventions. This is because the crime rate could have reduced or increased without the intervention due to national trends or other causal factors. Nor did we compare site E, the control site, with the crime rate in treated areas A-D because of the low frequency of crime events, any inference of the treatment effects would be subject to high degrees of uncertainty.[3] Rather, we contrasted crime rates recorded in sites A-D to the average crime rate recorded in the rest of Shropshire from areas that did not receive any kind of crime intervention during the period 2015-2017 (i.e., excluding the four treated sites and the green portions observed in Figure 13, Panel B). We then conducted a difference-in-difference analysis (DID). In the absence of a formal control group, a natural comparison for evaluation of the interventions is the contrast of the crime rates recorded in the treated sites to the overall crime rate recorded in the untreated area of Shropshire. DID compares the average change in crime rates for the treated sites to the average change in crime rates for the untreated area. The method allows the estimation of treatment effects even when the level of crime rates differs across sites. When the unobserved

differences between the treatment sites and the untreated area are time invariant, by taking the first difference (i.e., by comparing crime rates post-intervention vs crime rates pre-intervention) these unobservable characteristics are removed along with any omitted variable that remained constant over time within the sites. By using DID, we assume that any other crime preventing policy that occurred during the test period, has taken place evenly across all Shropshire.

The test period corresponded to the four quarters following each intervention, which was compared to the four quarters preceding each intervention.

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Figures 14-17 display the quarterly crime rates of dwelling and non-dwelling burglaries in the areas A-E across time. Red bars indicate the date at which the interventions finished (most often, the point when the signage was deployed---and so, the start of the test periods). There appears to be no apparent seasonal variation in crime rate. Except for Site A, all the post-intervention periods cover the year August 2016 to July 2017.
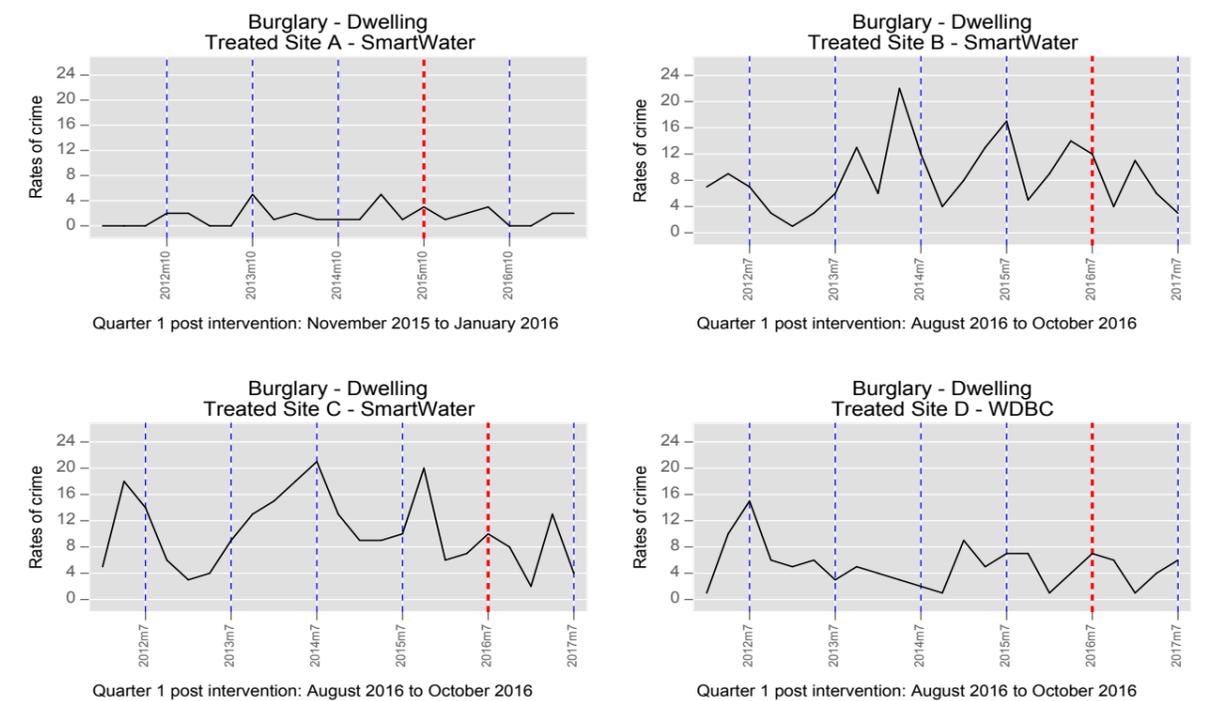

Figure 14. Quarterly Crime Rates of Dwelling Burglaries in Treated Areas. Red lines indicate the completion of the intervention setup. Blue bars are 12-month spaced to help the recognition of seasonal patterns.

Burglary - Non-Dwelling
Treated Site A - SmartWater

Quarter 1 post intervention: November 2015 to January 2016

Burglary - Non-Dwelling
Treated Site B - SmartWater

Quarter 1 post intervention: August 2016 to October 2016

Burglary - Non-Dwelling
Treated Site C - SmartWater

Quarter 1 post intervention: August 2016 to October 2016

Burglary - Non-Dwelling
Treated Site D - WDBC

Quarter 1 post intervention: August 2016 to October 2016

Figure 15. Quarterly Crime Rates of Non-Dwelling Burglaries in Treated Areas. Red lines indicate the end of the intervention under study. Blue bars are 12-month spaced to help the recognition of seasonal patterns.

Burglary - Dwelling
Treated Site E - Control

Quarter 1 post intervention: August 2016 to October 2016

Burglary - Dwelling
Rest of Shropshire County w/o Interventions

Quarter 1 post intervention: August 2016 to October 2016
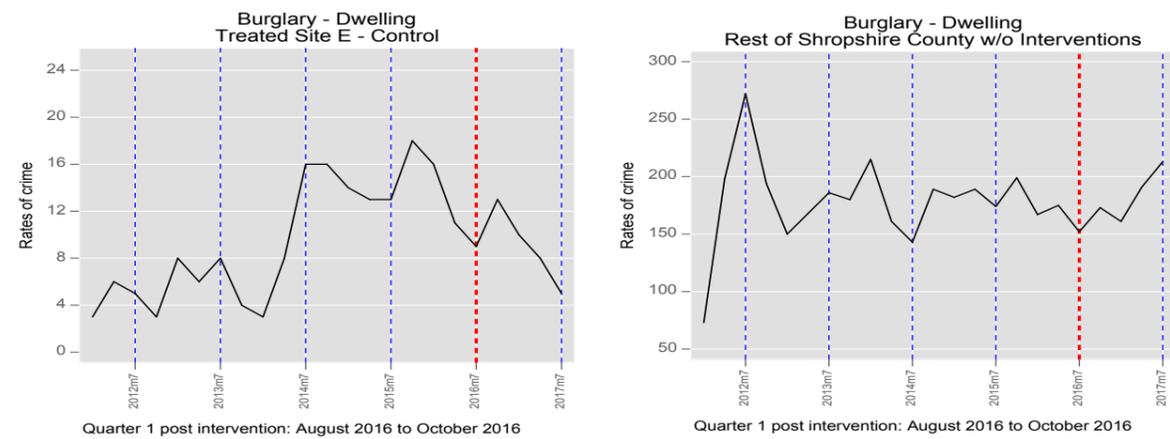
Figure 16. Quarterly Crime Rates of Dwelling Burglaries in Site E' and Control Area. Red lines indicate the end of the intervention under study. Blue bars are 12-month spaced to help the recognition of seasonal patterns.

Burglary - Non-Dwelling
Treated Site E - Control

Quarter 1 post intervention: August 2016 to October 2016

Burglary - Non-Dwelling
Rest of Shropshire County w/o Interventions

Quarter 1 post intervention: August 2016 to October 2016
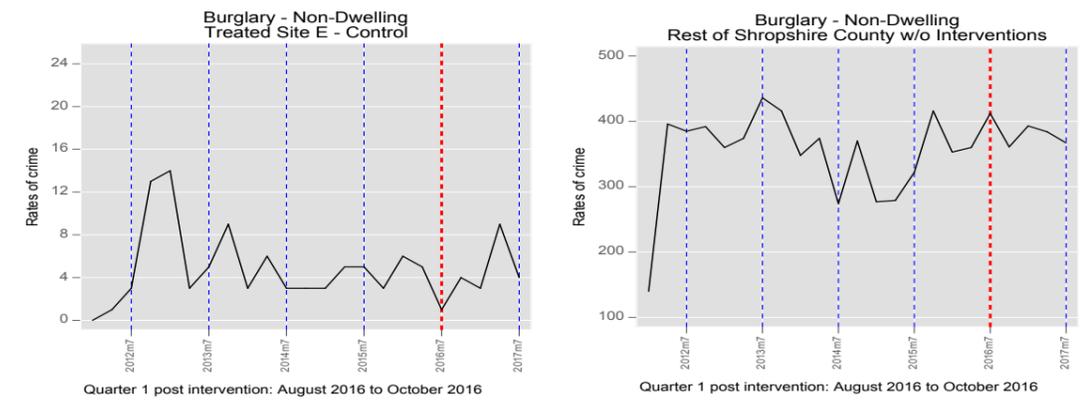
Figure 17. Quarterly Crime Rates of Non-Dwelling Burglaries in Site 'E' and Control Area. Red lines indicate the end of the intervention under study. Blue bars are 12-month spaced to help the recognition of seasonal patterns.

Despite aggregating counts of burglaries over the treatment areas, and over quarters, the counts remained low. Low counts provided challenges for our estimation strategy and for obtaining meaningful statistical inferences because low counts mean that statistical tests had low power. Our results, therefore, should be taken as an initial approximation of the treatment effects. This illustrates the difficulty in obtaining sufficiently large sample sizes from one force alone: There are not enough burglaries in West Mercia for good estimation of the effects of the intervention.

Results across each site are displayed in Figure 18.[4] Anything to the left of the red dotted line indicates a reduction in burglary in comparison to the rest of Shropshire while anything to the right indicates an increase. The black dots represent the burglary incidence rate ratio of crimes comparing each site to the rest of Shropshire. For example, the point estimate of 0.90 for Site A (top left), means that the increase in crime at Site A was only 90% of the increase in the rest of the untreated areas of Shropshire. However, the wide confidence interval, a consequence of the low counts, indicates that the change at Site A could actually be anywhere between under half (0.32) and or more than double (2.48) the change elsewhere. We observe that at Sites B, and C, changes in burglary in dwelling post-intervention were roughly 0.60 times greater (i.e., 40% less) than the changes observed in the rest of Shropshire. No statistically significant changes were detected in Sites A or D. On the other hand, positive effects in burglary in non-dwelling were only apparent in Site B, where changes in crime events post-intervention were between 0.10 and 0.54 times greater (i.e., 46% to 90% less) than the changes observed in the rest of Shropshire.


Rate Ratio Comparing Crime Changes in Treated Site Relative to the Rate Ratio Comparing Crime Changes in the Control Site*

Control Group: Rest of Shropshire County w/o Interventions
Changes in the average quartely crime rate from the one-year before the intervention to one-year after the intervention
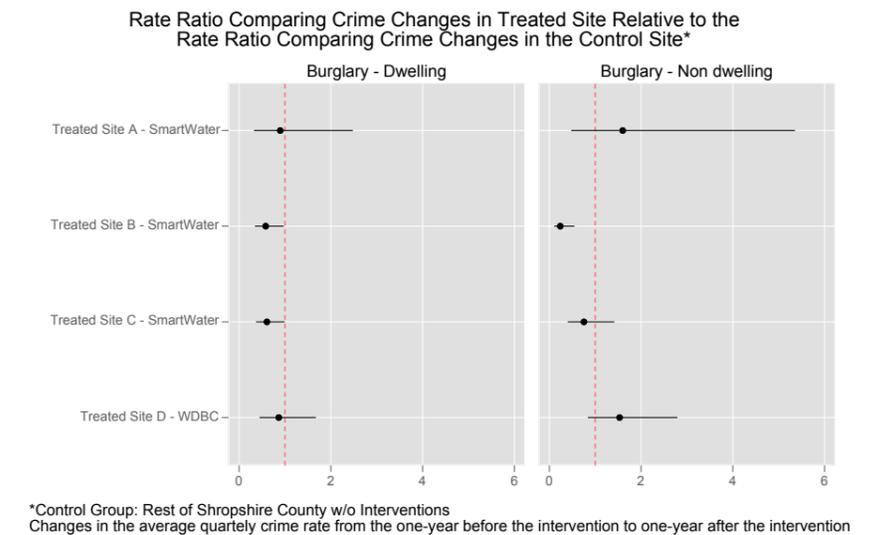
Figure 18. Average Treatment Effect Across Sites.

4   To evaluate the treatment effect on each individual site, we estimated a Poisson regression model for each site for each crime category using the following Equation

$$Y_{it} = \beta0 + \beta1 Treated_i + \beta2 PostIntervention_t + \beta3 Treated_i PostIntervention_t + \varepsilon_{it} \text{ (1)}$$

Where Y_{it} is the log of crime counts (either dwelling or non-dwelling burglaries) in site i during quarter t. $Treated_i$ is a dummy variable indicating the treated site; $PostIntervention_t$ is a dummy variable equal to one during the post-intervention period. $\beta3$ is the coefficient of interest that reflects the average treatment effect in site i. Points on the graph reflect the incidence rate ratios for the exponentiated coefficient $\beta3$ described in Equation 1. Bars span 95% confidence intervals.

We also estimated an overall treatment effect for Sites B, C and D, where interventions were implemented at the same time and therefore have identical post-intervention periods. To obtain an overall estimate of the treatment effects for these sites, we pooled the data which allowed us to use higher counts and estimate the average effect better. These results are shown in Figure 19.[5]

Figure 19 shows that across sites B-D, changes in burglary in *non-dwelling* post intervention were not statistically significant. Treatment effects were heterogeneous across the different sites: we saw a reduction in non-dwelling burglary in Site B only (and not in the Sites B-D average), which was not an anticipated result of the intervention.

However, on average changes in burglary of a dwelling post-intervention were between 0.47 and 0.89 times greater (i.e., were 11% to 53% smaller) than the changes observed in the rest of Shropshire.

Overall, these results suggest that during the year post-intervention there was, on average, a reduction in the rates of burglary in dwelling in the sites under study. However, since a reduction was also observed in Site E, the site that that was not subject to the roll out of either commercial or own brand forensic property marking interventions, these positive effects cannot be attributed directly to any of these two interventions. Changes in burglary in dwelling post-intervention in site E were roughly 0.63 times greater (i.e., 37% less) than the changes observed in the rest of the untreated area in Shropshire


Rate Ratio Comparing Crime Changes in Treated Site Relative to the Rate Ratio Comparing Crime Changes in the Control Site*

*Control Group: Rest of Shropshire County w/o Interventions
Changes in the average quarterly crime rate from the one-year before the intervention to one-year after the intervention
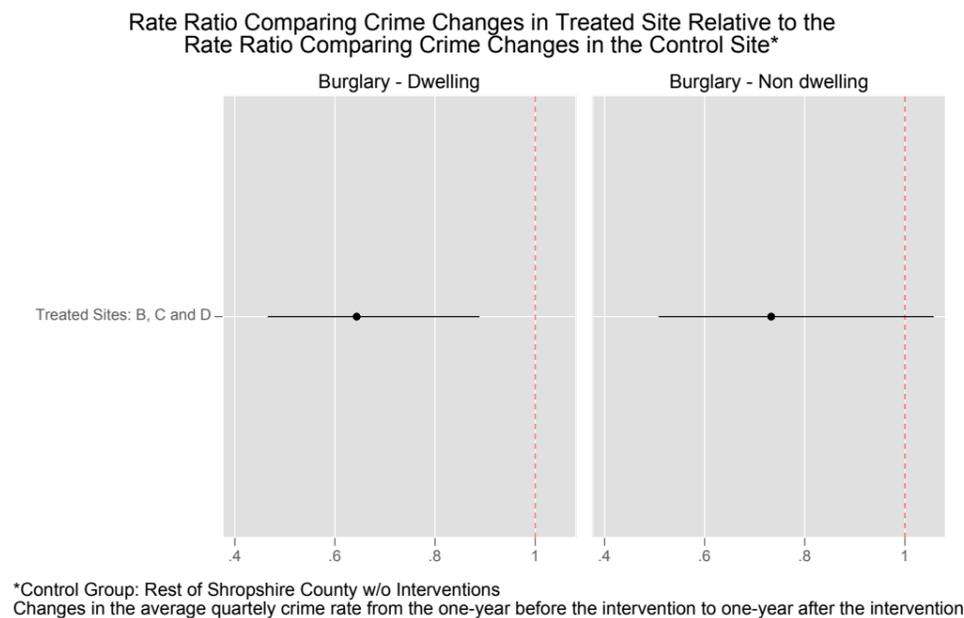
Figure 19. Overall Average Treatment Effect for Sites B, C and D.

There are several important caveats to mention about our results. First, because the numbers of burglaries in the treated areas is low, we have been unable to establish whether the trend over time is the same in the treated areas and in the rest of Shropshire –which is a condition for validity of the estimation that we have run. Second, areas were not randomly assigned to receive treatments, which means that the 11% - 53% estimated reduction may be, in part or in its entirety, a non-causal regression to the mean, or some other selection effect. That treated areas were not all high-burglary areas goes some way to addressing this concern. Our estimate of uncertainty does not include these known unknowns, and so strong claims about the WDBC/SmartWater treatment causing a reduction in burglary cannot be made from these data. Third, we are unable to explore the differences between WDBC and SmartWater because we do not have sufficient data. With these caveats in mind, our results should be taken as an initial approximation of the treatment effects and are subject to these caveats.

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5   To obtain an overall estimate of the treatment effects for these sites, we pooled the data and performed one Poisson regression for each crime type following
Equation 2:

$$Y_{it} = a_i + \beta 1 Treated_i + \beta 2 PostIntervention_t + \beta 3 Treated_i PostIntervention_t + \varepsilon_{it} \quad (2)$$

Where Y_{it} is the log of crime counts (either dwelling or non-dwelling burglaries) in site i during quarter t. a_i denotes sites' intercepts that allow to control for any (time invariant) heterogeneity across sites. $Treated_i$ is a dummy variable indicating the treated site; $PostIntervention_t$ is a dummy variable equal to one during the post-intervention period. $\beta 3$ is the coefficient of interest that reflects the average treatment effect in site i. Points reflect the incidence rate ratios for the exponentiated coefficient $\beta 3$ described in Equation 2. Bars span 95% confidence intervals.

2. Impact of the 14 interventions (including Sites A-D) since 2015 to 2017

What follows is an analysis of the crime rates for burglary of a dwelling and burglary of a non-dwelling across 14 treated sites (including sites A-D).

Pre-treatment burglary counts summed across the 14 treatment areas were less than 10% the counts summed across the non-treated area. This means that West Mercia Police could conduct a more powerful trial –maximising power with equal sized treatment and control areas. To estimates causal effects, the drive towards evidence-based policing necessitates police forces moving towards randomised control trials (note: this trial was not randomised) with a meaningful number of observations. As a crude rule of thumb: if it happens less than 500 times a year, you need to increase the size of the area or population treated to achieve a count nearer 500 to evaluate treatments.

How We Conducted Our Analysis

Across West Mercia Police's Force Area, we identified an additional 10 locations with crime interventions completed by June 2017 (the end of the latest quarter with available crime data). We combined crime data for these 10 areas with the original four sites A-D – the earliest intervention was completed in October 2015 and the latest one in May 2017.

For the overall impact evaluation across the force area, we again performed a DID analysis,[6] using the rest of the non-intervention areas across West Mercia's Police Force Area as our comparison crime rate or counterfactual. We defined a test period of seven-quarter intervals, starting from the fourth quarter of 2015, when the first intervention was completed, to the second quarter of 2017. The intention of using one single post intervention window was that these seven quarters would capture most of the post-intervention quarters and that each quarter would contain larger counts. The pre-treatment period used for comparison covered from the fourth quarter of 2013 to the third quarter of 2015.

Findings

Rate Ratio Comparing Crime Changes in Treated Site Relative to the Rate Ratio Comparing Crime Changes in the Control Site*

*Control Group: Rest of West Mercia Police's Force Area w/o Interventions
Changes in the average quarterly crime rate comparing the periods 2013q4-2015q3 to 2015q4-2017q2
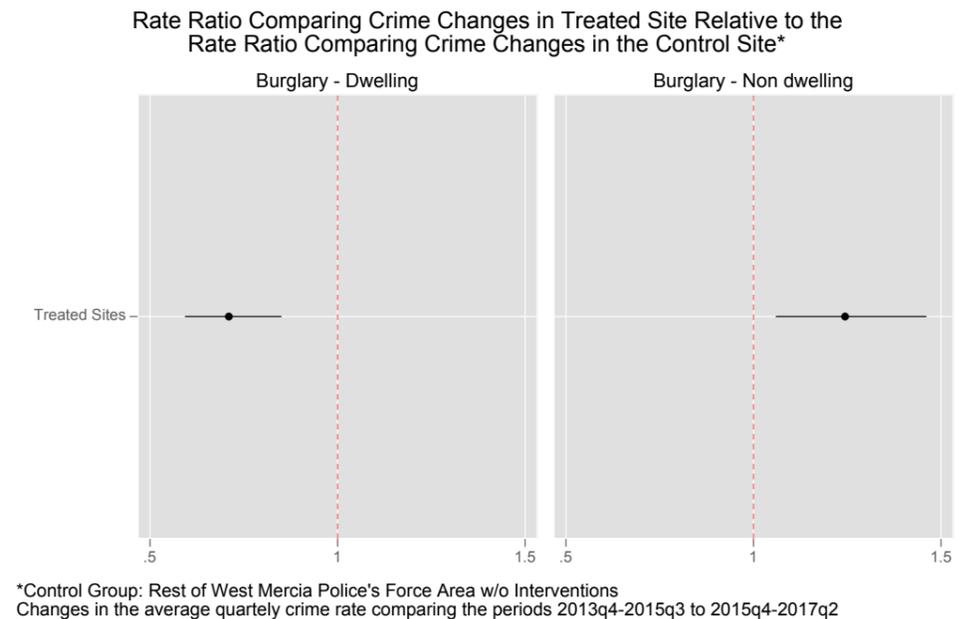
Figure 20. Overall Average Treatment Effect for 14 Treated Sites (including A-D)[7]

Across the 14 sites, we estimate a drop of between 15–41% in *burglaries of a dwelling*, compared to the rate of domestic burglary in untreated areas across the rest of West Mercia. The average changes in burglary of a dwelling post-intervention were 0.71 times greater (i.e., reduced by 29%) than the changes observed in the rest of the West Mercia between 2015 and 2017.

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6   As described by Equation 1.
7   Points on the graph reflect the incidence rate ratios for the exponentiated coefficient $\beta 3$ described in Equation 1. Bars span 95% confidence intervals.

However, effects in *burglary of a non-dwelling* were in the opposite direction, as we estimate a 6–46% *increase* in burglaries of non-dwellings compared to the rate of non-dwelling burglary in untreated areas across the rest of West Mercia. The average changes in non-dwelling burglary events post-intervention were 1.24 times greater (i.e., increased by 24%) than the changes observed in the rest of West Mercia. These estimates are subject to the same caveats described in Section 1.

X. Conclusion

In conducting this study, the questions we sought to answer were twofold: [1] to determine if the SmartWater intervention and West Mercia's WDBC intervention reduced crime levels reduced crime levels, especially dwelling house burglary, and, [2] to see if these interventions had any impact on levels of public confidence in, and victim satisfaction with, West Mercia Police.

Quantitative analysis of crime data for the sites B-D, where interventions were implemented at the same time and therefore have identical post-intervention periods, found that burglaries of dwellings were between 11–53% lower than would be expected based upon the trends in the untreated areas in the rest of Shropshire. We express our results as a range of possible reductions because we are 95% sure that the true answer lies somewhere in this range, but cannot estimate the reduction more precisely because of the limits of the data currently available to us. At the same time, for sites B-D, we estimate between a 49% reduction and a 6% increase in the rate of burglaries of a non-dwelling.

We went on to test these findings through analysis of recorded crime figures in the same time period, across a much larger area, and the results were similar. When combining data across 14 treated sites (including A-D that formed part of this study) between 2015 and 2017, we estimate a drop of between 15–41% in burglaries of a dwelling, compared to the rate of domestic burglary in untreated areas across the rest of West Mercia Police Force's area. This would appear to tally with police perception that burglary had fallen as a result of the interventions. At the same time, we estimate a 6–46% *increase* in burglaries of non-dwellings – the precise figure is uncertain. This seems to indicate that burglaries may have shifted from dwellings to non-dwellings during this period.

However, although estimates produced from combining data across 14 treated sites across West Mercia Police Force area are likely to give a better indication of reduction or increase in crime rates due to greater statistical power, it is still problematic to make causal connections between the reduction in expected crime rate and the impact of forensic property marking interventions. This is because the incidence of burglary in the treated areas is sufficiently low that we cannot be sure that treated and untreated areas followed similar trends before the treatment dates (a condition for the difference-in-difference analysis) and because sites were not randomly allocated to receive the treatments (which means it is always possible that some overlooked factor that is common to all of the treated sites is instead responsible for the reduction). Until research is conducted on a much larger scale and until sites are randomly allocated to treatments, West Mercia will not be able confidently to attribute reductions or increases in levels of crime to the interventions. This may have implications for whether they wish to continue to allocate resources to fund and implement these initiatives. Further research is also needed to investigate the impact of the interventions over a greater area for a sustained period of time, once initial police activity and community 'buzz' generated by the interventions has faded.

In addition to analysis of recorded crime statistics before and after the interventions, we surveyed residents across all five research sites for their views on policing. Analysis of the quantitative and qualitative data obtained indicates that reductions in recorded crime do not appear to affect either public confidence in, or victim satisfaction with, West Mercia Police.

Our quantitative survey results revealed that, as West Mercia Police had anticipated, having their homes broken into and something stolen was the biggest concern reported by residents across the majority of areas. However, awareness of SmartWater in their area resulted in residents reporting, on average, less fear of being the victim of burglary or theft and higher levels of confidence and satisfaction with police.[1] However, this perception may not necessarily be attributed to a belief in the deterrent impact of SmartWater among residents. Rather, what was most evident from the free text comments left by those surveyed was that police presence and the way that the police were perceived to respond to crime appeared to be the greatest determinant of public confidence in policing across all sites, compared to the small proportion who specifically commented upon or requested the SmartWater intervention.[2] These findings are in line with existing research demonstrating the influence of direct police engagement and communication on public confidence. Interviews with PCSOs and a community representative also suggested that the specific nature of the intervention was less important; it was the increased police visibility and engagement with the community, as a result of the intervention, that mattered.[3]

Therefore, our data suggests that higher levels of confidence in policing and less fear of burglary among residents who were aware of commercial FPM in their area may be more to do with increased police presence and community engagement – a by-product of administering and implementing the intervention – rather than

1   See pp 23 and 24 above.
2   See p 29 above.
3   See pp 33-35.

confidence in the intervention itself. As a result, West Mercia Police may wish to focus resources on a wider range of lower cost projects and interventions that afford them the same opportunity to promote their presence and engagement in the community. It has been suggested that one way of improving public confidence in West Mercia Police Force's area would be the greater dissemination of information to residents about what the police are doing in their locality, so that residents are assured that, despite limited resources, the police are trying to do their best. Indeed, one of the benefits identified by West Mercia Police Force in trialling and implementing property marking interventions is the opportunity to form greater links with the community, which have led to designing future initiatives that require local by-in and greater volunteer involvement, e.g. installing CCTV and using volunteers to monitor it. However, while this partnership approach may promote greater police engagement in the community, and therefore greater confidence, the success of such interventions may be attributed by residents, less to the actions of the police, and more to the input of dedicated volunteers and parish counsellors.[4]

XI. Afterword by Superintendent Tom Harding, West Mercia Police

This study has generated a real buzz within the policing community. There is a strong drive to understand 'what works' so that forces can learn from, and implement, best practice. As a result of this collaborative research with Warwick University, I can now be more confident that the property marking interventions we rolled out have had a positive effect on reducing domestic burglaries.

Though it is impossible to know the number of burglaries that may have been prevented in those areas that formed part of this study and to say for certain that it was the interventions that caused their decline, I can say with 95% certainty that burglary rates are between 18-52% lower than expected across 14 treated areas compared to the rest of West Mercia. As a result, I feel that the interventions have been a worthwhile investment.

There are concerns, of course, especially during times of contracting budgets, about the input costs of crime prevention initiatives and this is one point raised in the conclusion. But it is important to remember the savings made in avoiding or preventing crime to policing: the cost of investigating domestic burglary to policing is approximately £1000 per incident. In calculating the cost-benefit ratio of this study, it is also essential to emphasise the human costs of burglary and the value of sparing people the trauma of having their homes broken into in the first place. The model of joint funding and of rolling out the intervention we have developed in collaboration with local town and parish councils, has also meant that we can cover many thousands of homes for a few thousand pounds.

When spending public money, it is essential to assess the impact of interventions and through this collaboration with the COPR I have seen first-hand the necessity for independent analysis in attempting to do just that; it can be all too easy to rely on statistics produced by those with a commercial interest, or indeed your own, in-house crime statistics. It can also be difficult to avoid unconscious bias when you have invested heavily in a project. Working with independent researchers and experts in quantitative and qualitative methods undoubtedly increases the reliability and the credibility of this research. However, utilising rigorous, academic methods, I have also learnt that it is difficult to attribute a reduction in crime or an increase in public confidence to a single intervention, outside the context of other factors. For example, in this project, there were questions raised over whether the incident rate of burglary in sites A-D was statistically significant enough to draw causal conclusions, which is why the analysis was widened to include a further 10 sites. Does this difference in approach or standards mean that police forces and academics should not work together? Certainly not – but where police and independent researchers collaborate on projects it is necessary to be realistic, from the outset, on what is achievable at a local level with the resources available; striking the balance between what is deliverable and what is desirable. Like any relationship, there is give and take around what we can and cannot do. I take away from this collaboration a better understanding of the limitations of the statistical data that is essential to my everyday work and which is heavily relied upon by managers and government to assess police performance, policy and practice.

In general, the police service is too ready to attribute success to interventions that may be reliant on weak data and I will certainly look to change the way I evaluate preventative projects going forward. Furthermore, rather than focusing merely on crime reduction, this study has emphasised the importance of trying to understand the wider factors affecting confidence in policing and fear of crime at the grass-roots level as well. Though the surveys were time-consuming and difficult to distribute, this has provided us with a much more detailed insight into the priorities of the communities we serve through the mixed method approach COPR recommended and which we adopted.

Our time and resources are now more precious than they have ever been. However, now is the time that we should be investing in interventions. We have to make every penny count so that we can focus on preventing serious harm and risk, but not at the exclusion of targetting acquisitive crime. Although we are increasingly busy, we must also take the time to evaluate these interventions thoroughly and be more certain about their effects and limitations. Through engaging with academics, police forces can learn to be more critically aware of the ways in which we can, more holistically and reliably, evaluate the effectiveness of interventions, not just for crime reduction but also fear of crime and public confidence in policing. Rather than focusing on the initial outlay, we have to consider the overall savings to be made as a result of avoiding or preventing crime, not just to our budget but also the victim.

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4   See p 34. This was also apparent in some qualitative survey comments.

WARWICK

Your final opportunity to shape the future of policing in [location] – and win £100!

You may have completed a similar survey in December 2015 or July 2016. Thank you very much for responding if you did. We are interested in people's views over an extended period, so this is the third and final follow-up survey we will be sending you. It doesn't matter whether or not you completed the previous surveys. We're still interested in everyone's views and any resident in [location], 18 years or older, can complete this survey.

To contribute your views on local policing, please **complete the short survey** attached and return it in the **pre-paid envelope** by **20 January 2017** or complete the survey online: **[link provided]**

All respondents may choose to be entered into a **£100 prize draw and if you've already entered the draw you will be entered again!**

[QR provided]

Scan QR to go directly to online survey
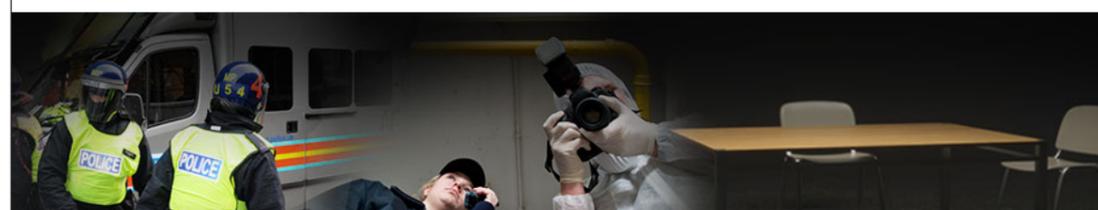
WARWICK

Crime and Policing Survey

Researchers from the Law School and Psychology Department at Warwick University are seeking the views of residents (aged 18 and over) in **[location]** for research on crime and policing.

The information you provide will be used to help understand the behavioural science of policing and could affect policing in your area. We'll share our answers by writing academic publications and policy papers for professionals working in this area.

We won't ask for your name and we won't do anything that could identify you.

Please tick this box to indicate your consent for inclusion in the study ☐

Please enter the date on which you complete the survey _____

In agreeing to participate in this study you can enter into a **prize draw for £100. Please provide your email address if you wish to be entered.** We may use this to invite you to take part in a follow up focus group, and to contact you if you win the prize draw. We won't keep your email address with your survey answers. We won't use your email for anything else or share it with anyone.

Email: …………………………………………

2

NOTE: THERE IS A BOX AT THE END OF THE SURVEY TO PROVIDE FURTHER COMMENTS. PLEASE WRITE ANY ADDITIONAL COMMENTS IN THIS BOX.

Most of us worry at some time or other about being the victim of a crime. How worried you are about the following? (Please circle)

1 = Very worried   2 = Fairly worried   3 = Not very worried   4 = Not at all worried

...having your home broken into and something stolen?	1	2	3	4
...being mugged and robbed?	1	2	3	4
...having things stolen from your car?	1	2	3	4
...being raped?	1	2	3	4
...being physically attacked by strangers?	1	2	3	4
...being subject to a physical attack because of your skin colour, ethnic origin or religion?	1	2	3	4
...having your personal items stolen from you while you are out and about?	1	2	3	4
...having things stolen from outside your home (e.g., shed, garden, communal area)?	1	2	3	4

How much is your own quality of life affected by fear of crime? (Please circle)

1   2   3   4   5   6   7   8   9   10
No effect   Total effect

3

Here are some statements about the police. For each statement, please indicate to what extent you agree or disagree. You don't need to have had contact with the police to answer the questions. We are just interested in your general opinion.

1 = Strongly agree   2 = Agree   3 = Disagree   4 = Strongly disagree

You should do what the police in this area tell you, even if you disagree	1	2	3	4
You should accept decisions made by the police in this area, even if you think they are wrong	1	2	3	4
You should do what the police in this area tell you to do, even when you don't like the way they treat you	1	2	3	4
The police in this area abuse their power	1	2	3	4
The police in this area can be trusted not to exceed their authority	1	2	3	4
The police in this area think they are above the law	1	2	3	4
The police in this area reflect the mix of people in your community	1	2	3	4
The police in this area usually act in ways that are consistent with my own ideas about what is right and wrong	1	2	3	4
The police in this area can be trusted to make decisions that are right for the people in this neighbourhood	1	2	3	4

4

We would like to ask you what you think about the police in your area. You don't need to have actually had contact with the police to answer these questions, we are just interested in your general opinion about the police in this area.

1 = Strongly agree	2 = Tend to agree	3 = Neither agree or disagree	4 = Tend to disagree	5 = Strongly disagree

They (the police in this area) can be relied on to be there when you need them	1	2	3	4	5
They (the police in this area) would treat you with respect if you had contact with them for any reason	1	2	3	4	5
The police in this area treat everyone fairly regardless of who they are	1	2	3	4	5
They (the police in this area) understand the issues that affect this community	1	2	3	4	5
They (the police in this area) are dealing with the things that matter to people in this community	1	2	3	4	5
Taking everything into account I have confidence in the police in this area	1	2	3	4	5

5

Can you tell us how much of a problem these things are in your area. By your area we mean within 15 minutes walk from your home.

1 = A very big problem	2 = A fairly big problem	3 = Not a very big problem	4 = Not a problem at all

...noisy neighbours or loud parties?	1	2	3	4
...teenagers hanging around on the streets?	1	2	3	4
...rubbish or litter lying around?	1	2	3	4
...vandalism, graffiti and other deliberate damage to property or vehicles?	1	2	3	4
...people using or dealing drugs?	1	2	3	4
...people being drunk or rowdy in public places?	1	2	3	4
...abandoned or burnt out cars?	1	2	3	4
...speeding traffic?	1	2	3	4

We are now going to ask you about things that may have happened over the last 12 months, that is since December last year, in which you may have been the victim of a crime or offence. We are only concerned with incidents that have happened to you personally or to other people who are members of your household.

We don't just want to know about serious incidents – we want to know about small things too.

Have you been the victim of a crime or offence?   Yes   No

If Yes, please continue to page 7. If No, please go to page 8.

6

If yes, can you tell us, very briefly, about the incident?

Where did the incident happen?

Did the police come to know about the matter? Yes No

Do you think the police treated you fairly? Yes Not entirely Not at all

Did the police treat you with respect? Yes Not entirely Not at all

Overall, were you / the victim satisfied or dissatisfied with the way the police handled this matter?

Very satisfied | A bit satisfied | A bit dissatisfied | Very dissatisfied | Too early to say

---

Are you or any other household members serving police officers (including Police Community Support Officers (PCSOs))?

Yes   No

Since October last year have you had contact with the police?

No contact   As a victim   As a witness   As a suspect   Other

If 'other', please tell us about this contact   ………………..

How dissatisfied or satisfied are you with your life overall? (please select one)

1 Completely dissatisfied

2 Mostly dissatisfied

3 Somewhat dissatisfied

4 Neither satisfied nor dissatisfied

5 Somewhat satisfied

6 Mostly satisfied

7 Completely satisfied

Do you have home contents insurance?   Yes   No   Don't know

Are you aware of any new police interventions in [location]? (please circle any that apply)

1 The distribution of free Smartwater® packs and crime deterrent stickers to local residents

2 The distribution of free Smartwater® packs and crime deterrent stickers to burglary victims

3 The distribution of free UV pens and crime deterrent stickers to all local residents

4 The distribution of free UV pens and crime deterrent stickers to neighbours of burglary victims

5 Signage in the area advertising the 'We don't buy crime' campaign

6 Signage in the area advertising the 'Designing out crime' campaign

Finally, below we ask some demographic questions. These questions help us to understand how policing affects different members of the community.

How old are you? (please circle)

Under 20	45-49	75-79
20-24	50-54	80-84
25-29	55-59	85-89
30-34	60-64	90 or over
35-39	65-69	
40-44	70-74	

What is your sex?

Female
Male
Other, please specify if you wish to:
Prefer not to say

What is your ethnicity? (please select one)

Asian or Asian British	Black or Black British	Mixed	Chinese or other ethic group	White	Prefer not to state
Indian	Caribbean	White & Black Caribbean	Chinese	British	Not stated
Pakistani	African	White & Black African	Any other ethnic group	Irish	
Bangladeshi	Any other Black ethnic background	White & Asian		Any other White ethnic background	
Any other Asian ethnic background		Any other mixed ethnic background			

Did we miss something? Use this space to tell us more about crime and policing.

Thank you for taking part in our survey. If you have any concerns or questions about the study please email Prof Neil Stewart in the Psychology Department at Warwick University: **Neil.Stewart@warwick.ac.uk**

If you have a formal complaint about this study, please address your complaint to the person below, who is a senior University of Warwick official entirely independent of this study:

Head of Research Governance
Research & Impact Services
University House
University of Warwick
Coventry
CV4 8UW
Tel: 024 76 522746

Email: Jane.Prewett@warwick.ac.uk / E.C.Dight@warwick.ac.uk

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed.

Appendix B: Additional Data from Survey Respondents

Confidence with Policing

The police reflect the mix of people in your community

The police act in ways that are consistent with my own ideas aboutwhat is right

The police can be trusted to make decisions that are right for this neighbourhood

Sites
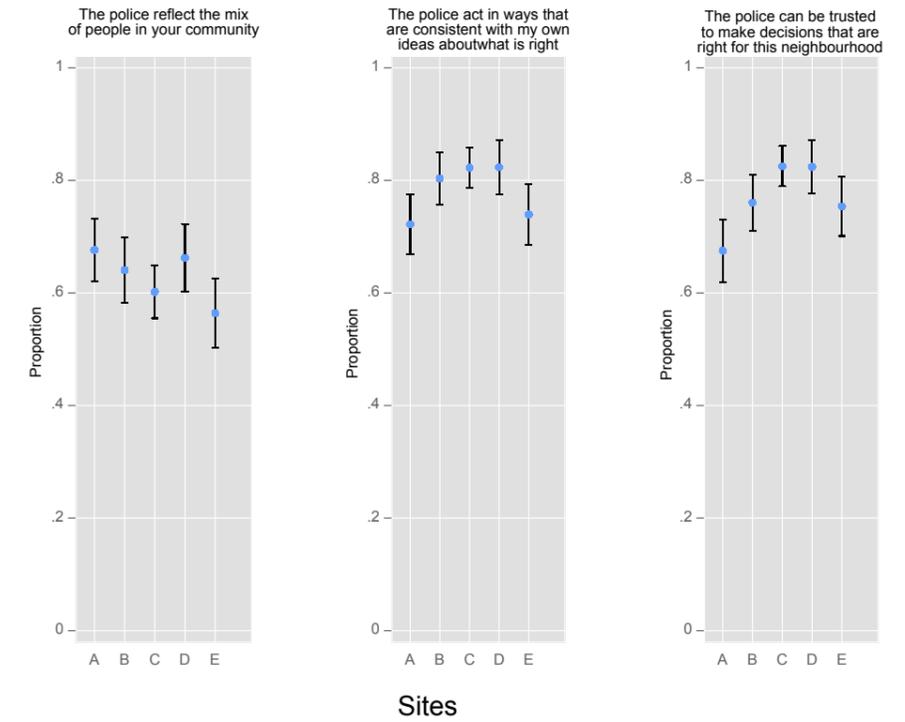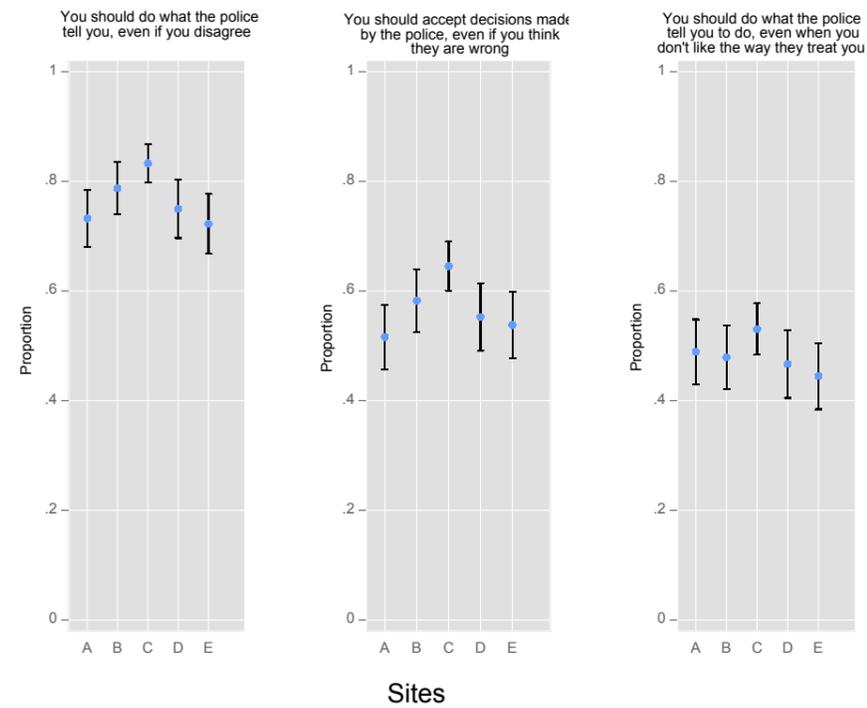
Figure 1-A (continuation).   Proportion of people who agree or strongly agree with statements of police legitimacy

You should do what the police tell you, even if you disagree

You should accept decisions made by the police, even if you think they are wrong

You should do what the police tell you to do, even when you don't like the way they treat you

Sites

The police abuse their power

The police can be trusted not to exceed their authority

The police think they are above the law

Sites
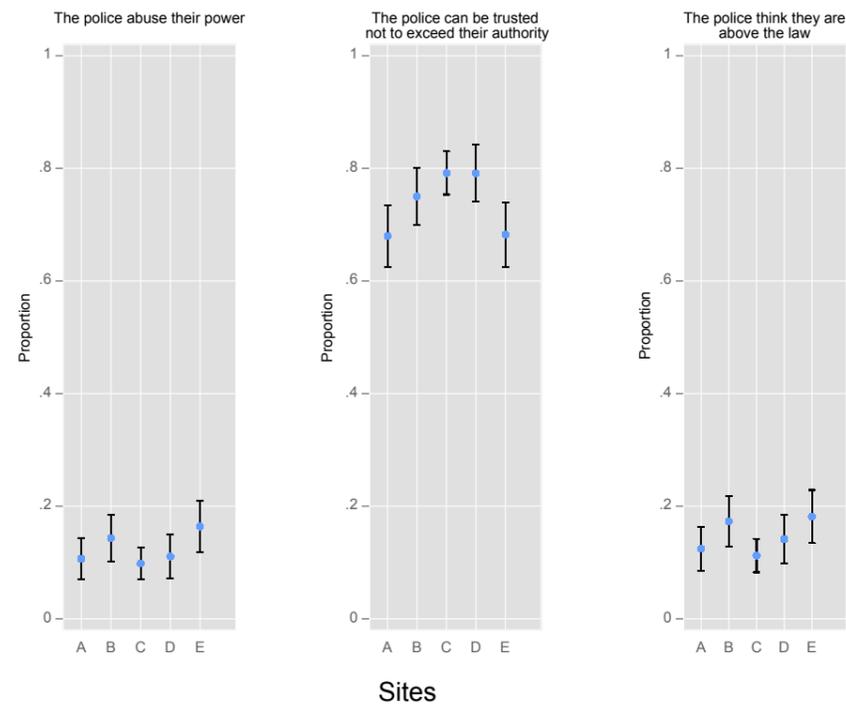
Figure 1-A.   Proportion of people who agree or strongly agree with statements of police legitimacy
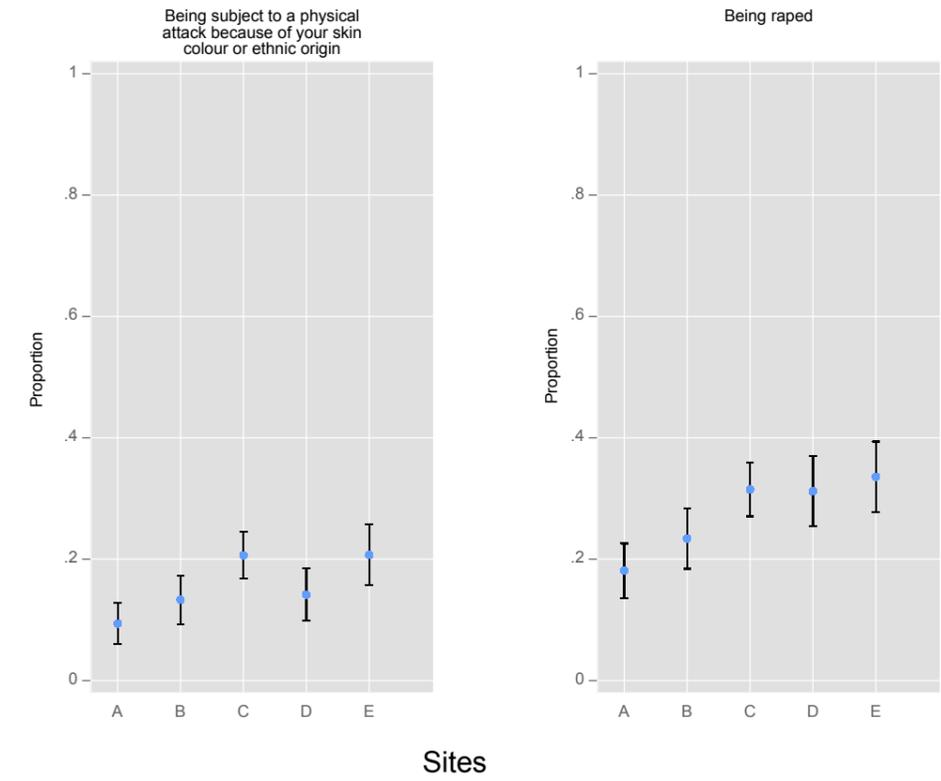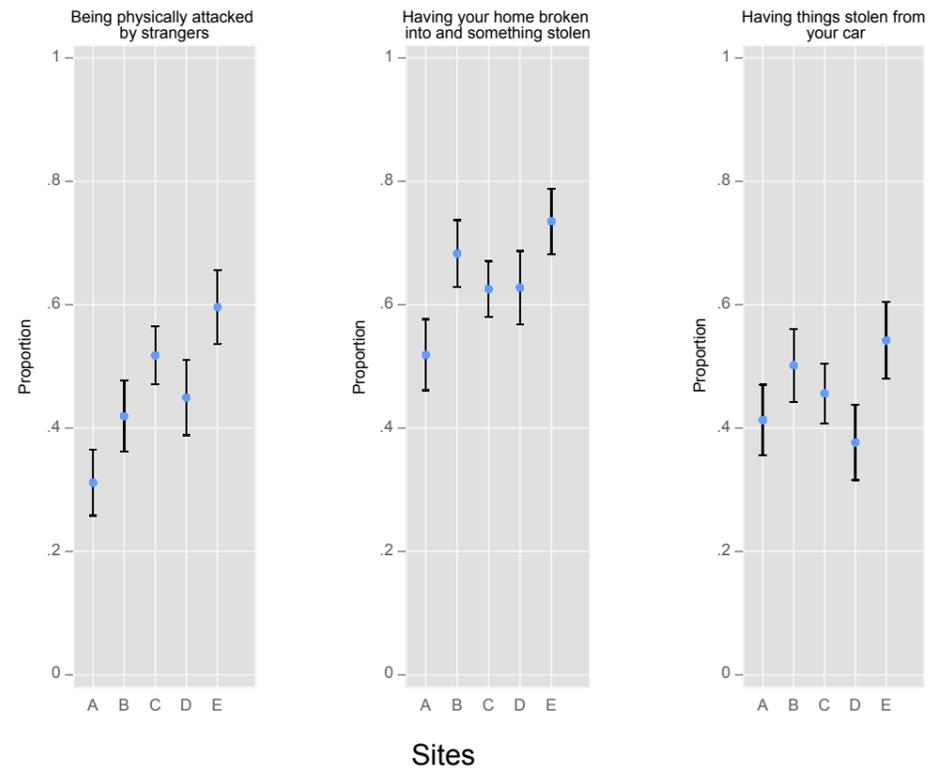
Figure 2-A. Proportion of people who is at least fairly worry about certain incidents of crime
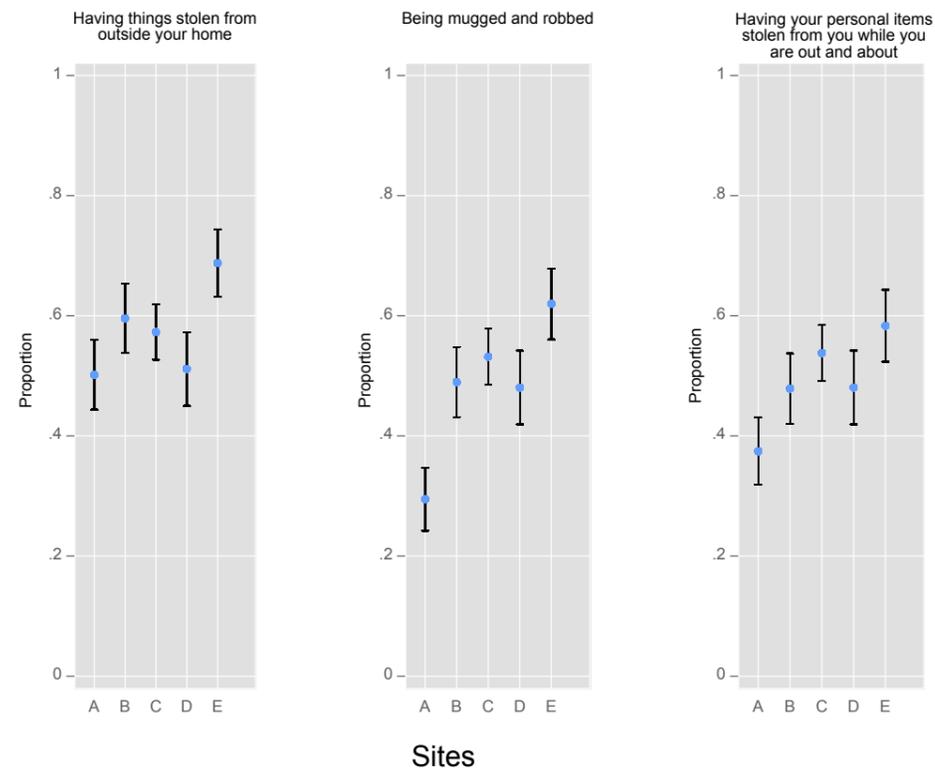
Problems in Area
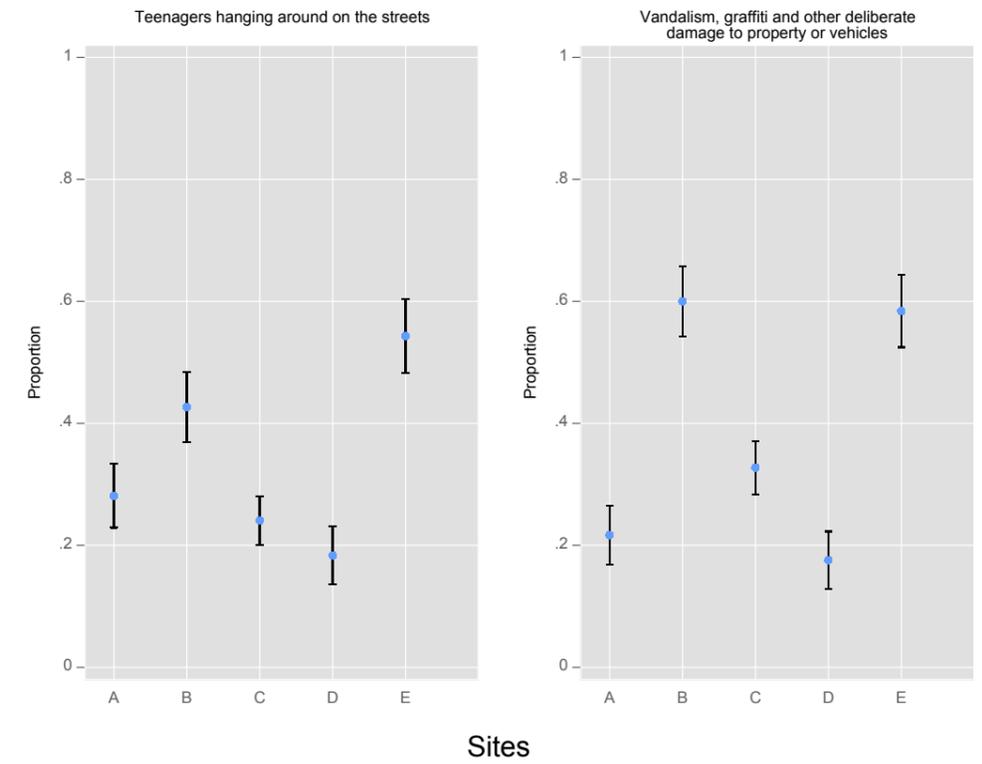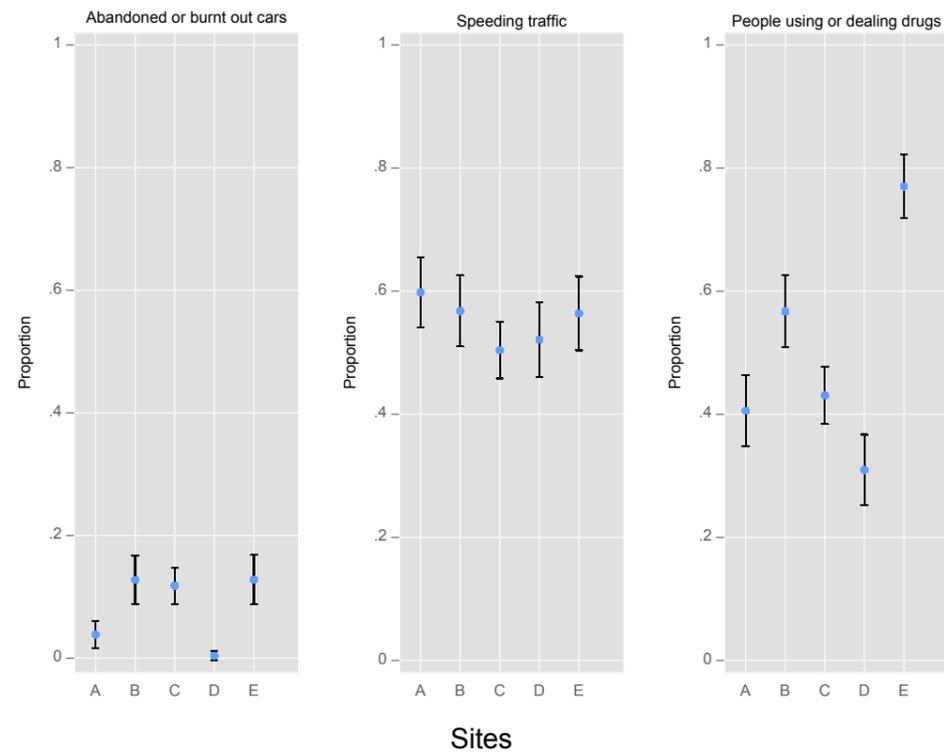
Figure 3-A. Proportion of people who report certain local problems to be at least fairly big.
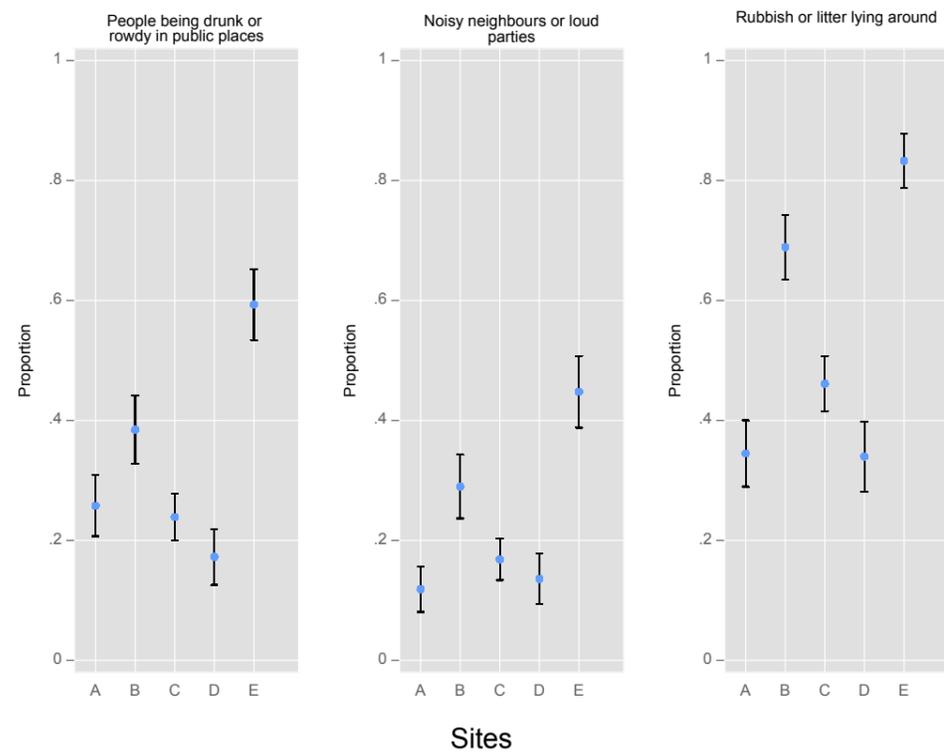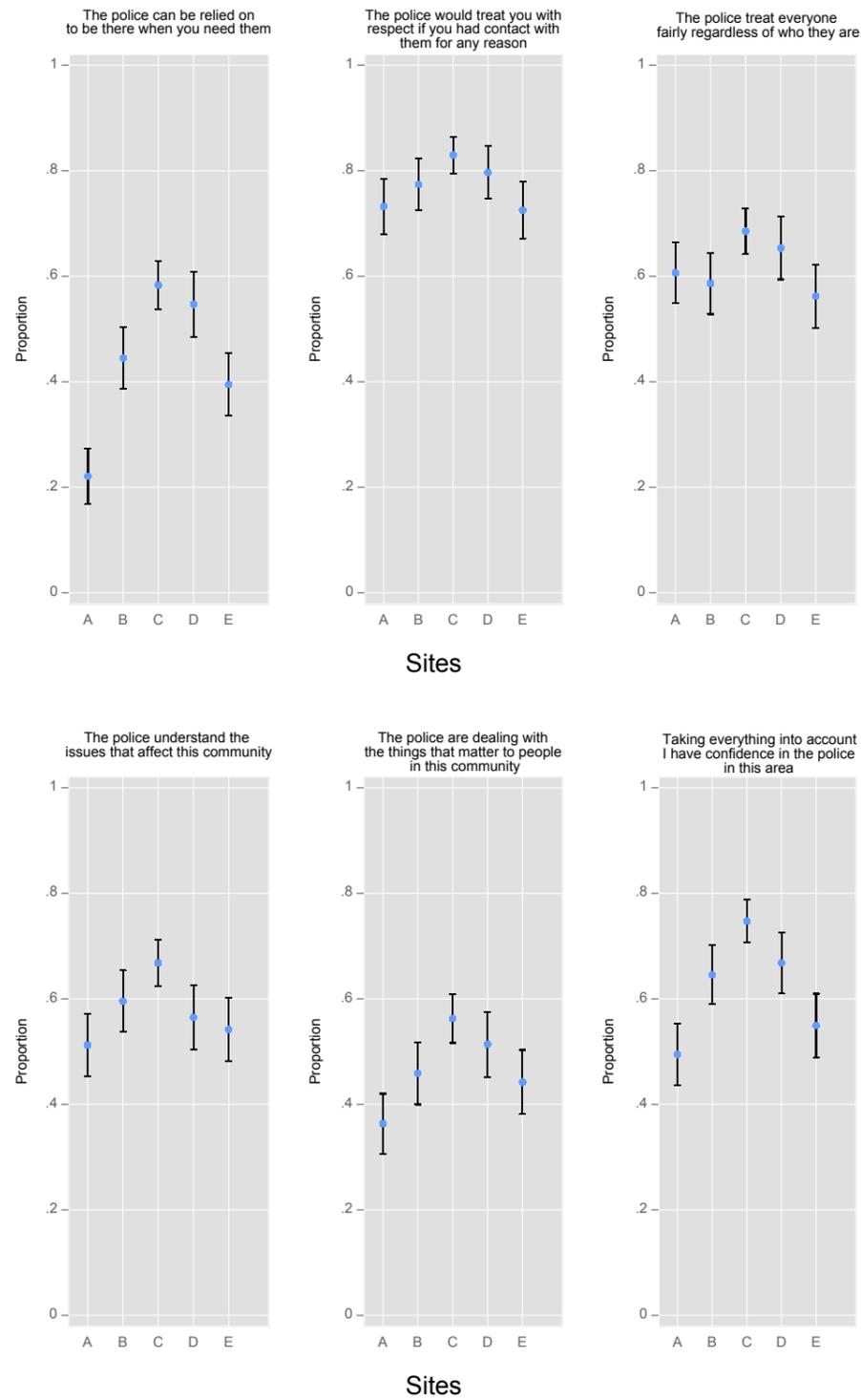
Figure 4-A. Proportion of people who agree with positive statements of police legitimacy
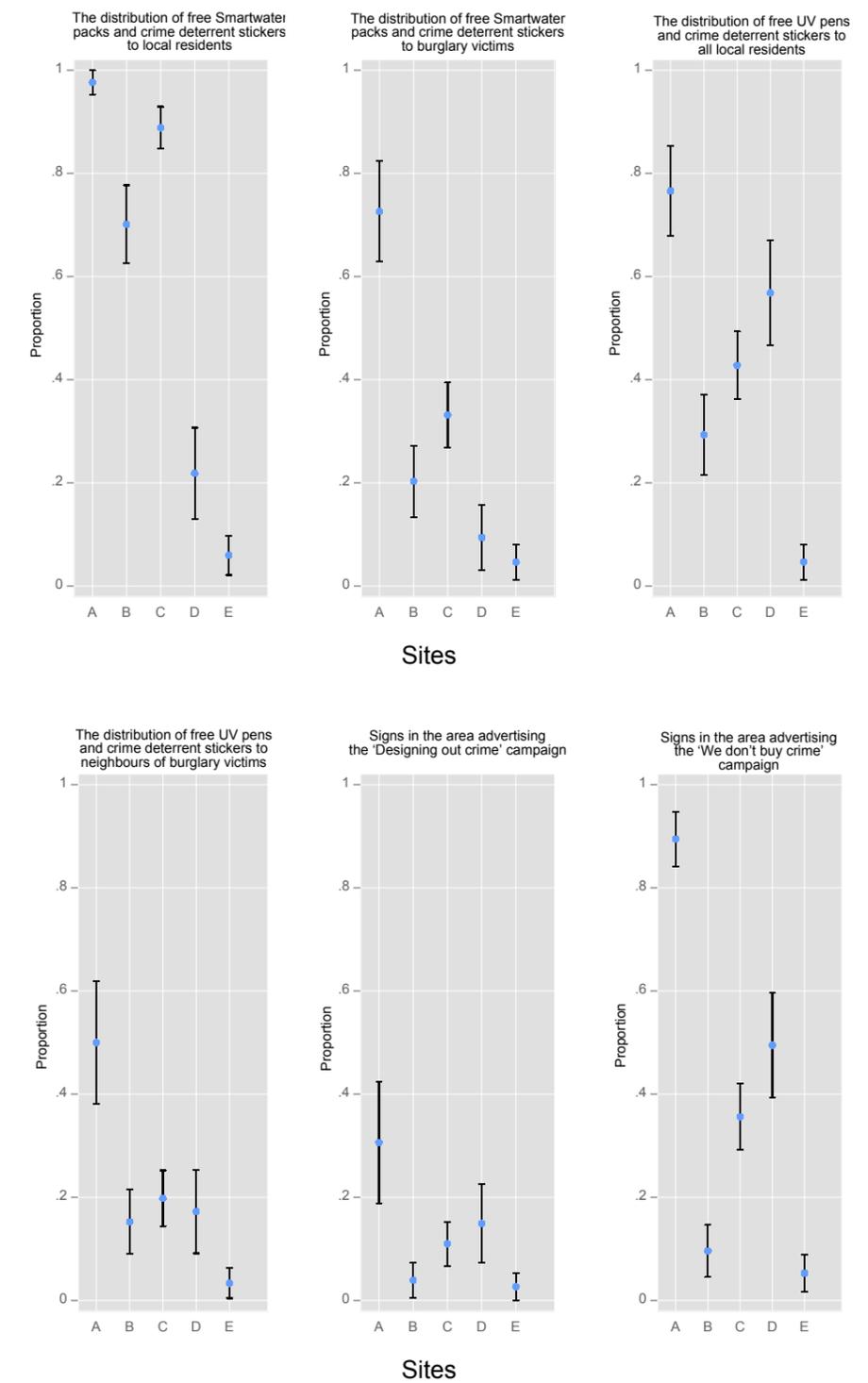
Figure 5-A. Proportion of people who report being aware of crime-fighting interventions