# Hotspots Policing

Combined findings from two randomised controlled trials of hotspots policing in the Thames Valley

What is the What Works Series?

Welcome to Thames Valley Violence Prevention Partnership's "**What Works**" series; a collection of publications which present the results from our intervention evaluations and relevant pieces of research.

- A key role of the Violence Prevention Partnership programme is to invest our Home Office grant into the testing of new intervention approaches; funding not only their delivery in our local areas but to run robust evaluations of those interventions, adding to the evidence base around what works in preventing violence.

- We aim to gather evidence on the effectiveness and impact of interventions in preventing or reducing violence. That evidence is then played back to our local partnership systems to provide learning, and to inform the system change that is needed if we are to shift our focus towards higher impact intervention and diversion approaches.

- Our evaluations and research also contribute to a growing national evidence base, through formal academic publication and sharing with bodies such as the Youth Endowment Fund and the wider network of Violence Reduction Units (VRUs).

- Each of our interventions has been through a rigorous research and design phase, using our Research Project Lifecycle which puts in place a structure around which the highest quality of research projects can be designed and run. The Lifecycle ensures that interventions

are based on quality ideas, knowledge of the existing evidence, analysis of data relating to cohort design and expected caseload, and well-documented design decisions. This ensures that the way that we implement and deliver the intervention is consistent, and enables us to deliver the right test of an intervention that is based on evidence, and that can actually be implemented in the real world. This also allows us to run multiple concurrent Randomised Control Trials (RCT), the gold standard approach to determining what works.

- Through the Thames Valley "What Works" series of publications, we provide all our partners with an accessible, yet complete, summary of key findings from our research. We aim to identify next steps and to assist in identifying how the learning could be applied to wider local services, to support that longer term, sustainable approach to preventing and reducing violence in our communities.

- For clarity, this is our local approach and is separate to other "what works" approaches being undertaken by other bodies, such as the Youth Endowment Fund. Although we will be sharing our evaluations accordingly to contribute to the wider evidence base.

WHAT WORKS
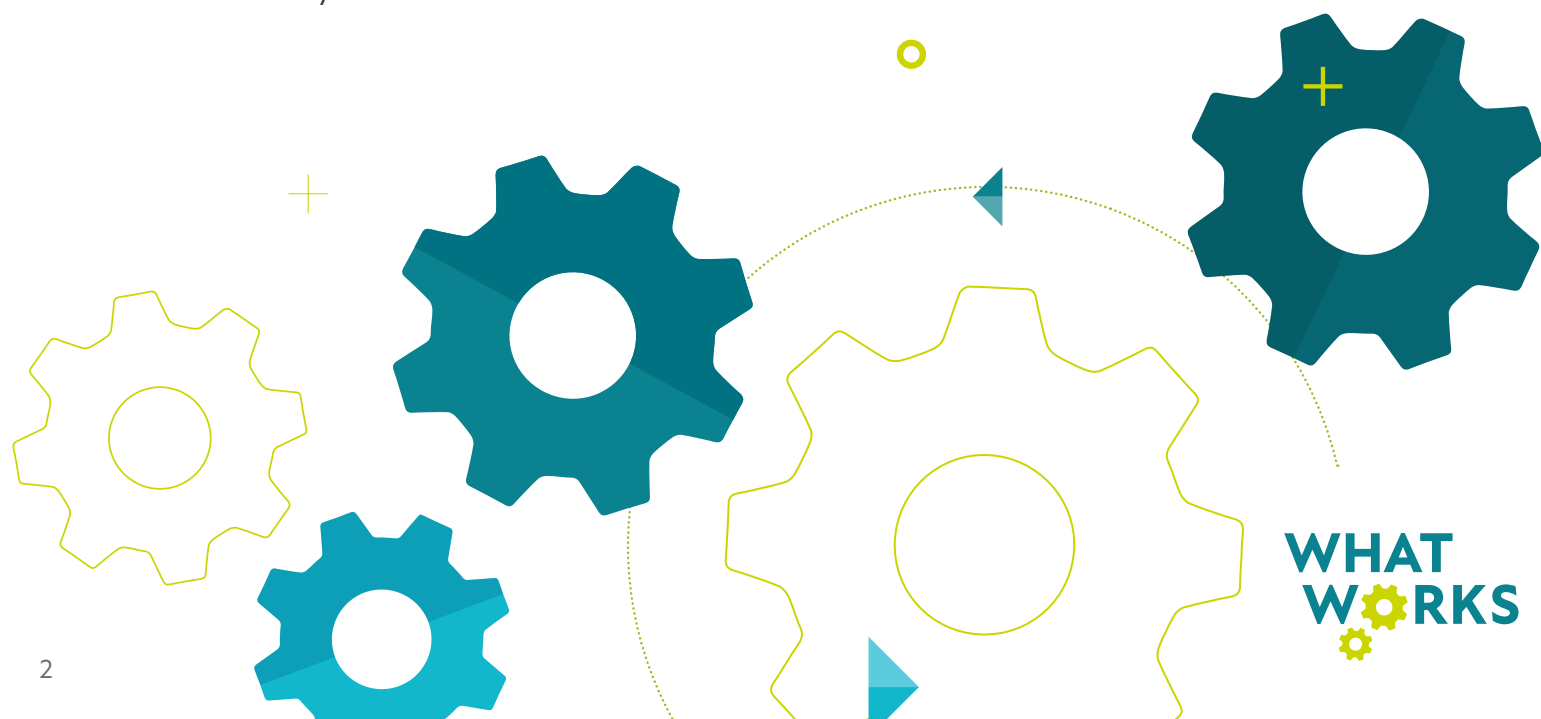
What are we testing?

Each of our interventions or research exercises has been carefully designed around a clearly defined test methodology, cohort and research question. We have used our Research Project Lifecycle to ensure that we deliver an efficient, evidence-based intervention in a way that it can be tested in the real world using the most rigorous research methods possible. More detail relating to our Research Project Lifecycle can be found at Appendix A on page 23.

Hotspots policing has been well-tested in the United States, and there is a large body of evidence demonstrating that crime concentrates at place, and that those places are relatively stable over time. Given that, policing of those areas through visible proactive patrols has been shown to decrease crime levels in a US context when officers were directed to small areas of geography where they could be seen from the entire area (or hotspot) during their patrol, and where they patrolled for 11 to 15 minutes each time. However, crime in areas where hotspots policing has been well evidenced is much higher than in the Thames Valley, so we need to work out whether the evidence transfers well, and how and if hotspots policing works best in the Thames Valley and other similar areas of the UK.

This report summarises the findings of two trials of hotspots policing which were conducted in the Thames Valley between 2021 and 2024. Both trials were randomised controlled trials, and were conducted across the entirety of the Thames Valley, but they differed in the ways that the hotspots were designed, and the officers who were conducting the patrols.

Both trials also incorporated the use of a mobile phone application so that officers could be tasked to attend the hotspots, a novel approach to tasking of officers which also allowed for a much more efficient oversight and tasking process.

Summary of Trials

Trial One

Trial One identified small hexagonal areas which were about the same area as seven football pitches, with each edge of the hexagon being 150m long. This was consistent with existing best practice, to examine how well best practice from the US transfers to areas with lower crime concentration and rate. Key lines of enquiry included:

▶ **Does tasking officers to attend hotspots of crime through use of a mobile phone application work to increase patrols?**

▶ **Does the evidence from the US on how hotspots should be identified work in the same way in the Thames Valley?**

▶ **Does hotspots policing, conducted in this way, reduce crime in the Thames Valley?**

Trial Two

Trial Two identified larger areas than before that made sense geographically as areas that could be patrolled, and directed local officers to patrol those areas through use of a mobile phone application. This was a test of hotspots that were designed around crime levels in the Thames Valley, using the results of the first trial to inform our decision making. We tested:

▶ **Does tasking local officers to attend hotspots of crime through use of a mobile phone application work to increase patrols?**

▶ **Do larger areas that make sense in the local geography allow us to create areas with higher rates of crime to patrol?**

▶ **Does patrolling these areas with local officers reduce crime in these areas?**

These two trials are combined into one What Works paper in order to provide overall findings in relation to our tests of hotspots policing, and how it performs to reduce crime, in the Thames Valley.

WHAT WORKS

Key findings Summary

Trial One

45 hotspots created

Over 3,500 additional patrols of at least 13 minutes in length were conducted through using the application

There was more activity by Joint Operations Unit (JOU) officers in hotspots on treatment days than on control days; the mobile application did work for directing forcewide resources to specific patrol areas. But, even though there was a 93% increase in JOU patrols, this only led to a 19% increase in overall activity due to high baseline activity (hotspots were already being patrolled).

Use of a timer in the mobile phone app led to patrols being reliably of the desired length.
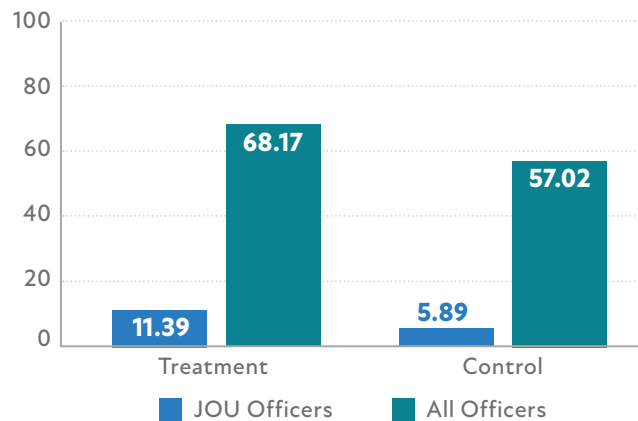

Figure 1. Activity in hotspots as measured by Airwave radio pings, compared between treatment and control days.

However, whilst there was indication that crime prevalence in hotspots reduced by 8.74% on treatment days, this is not significant and is of much lower levels than have been seen in US trials.

8.74%

Our test focused on hotspots designed in a way that was comparable to the methods used in earlier US trials. However, the baseline levels of crime in these hotspots was already very low and therefore recording any significant change due to hotspot patrolling was difficult.

In our hotspots – there was less than one crime every three to four days and less than one violent crime every 7.5 days

Hotspots designed in line with best practice from the United States is not what works for the Thames Valley and similar areas of the UK, but mobile phone applications can be incredibly effective in directing patrols.

WHAT WORKS

Trial Two

34 hotspots created

Using a new method of creating hotspots did incorporate higher frequency of crime, with 1.7 crimes per hotspot per day on average. But this is still very low rates of crime, and when looking at violent crimes this decreased to 0.53 crimes per hotspot per day on average.

There was no change in crime rate due to hotspot patrols.

17,794 patrols recorded in the application over seven months, but there was no difference in Airwave radio activity between treatment and control days.

There was no difference in stop and search rates between treatment and control days.

One-sided tracking of patrols (using the application only) does not seem to be sufficient to run a rigorous trial. Inability to track activity regularly using Airwave radio data meant that the lack of difference in Airwave activity was not picked up until later.
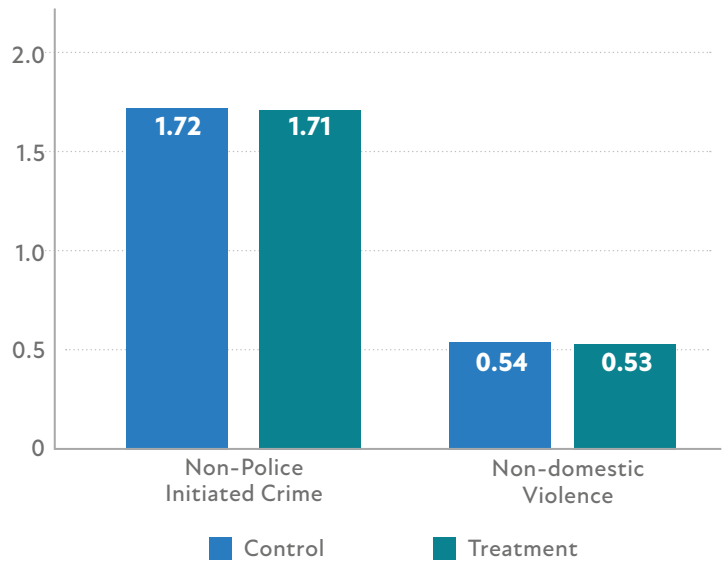

Figure 2. Crime rates for non-police initiated crimes and non-domestic violence between treatment and control days.

Possible explanations for lack of crime prevention:

▶ Local officers learned where the hotspots were through the experiment, and started patrolling them regardless of whether they appeared in the application

▶ There was already such a high level of activity in these areas that the application didn't change the activity, just allowed officers to record it on treatment days, or that the additional level of patrol was just too small, a drop in the ocean

▶ Experience level of officers following COVID-19 lockdowns may have impacted efficacy of patrols and more training would be beneficial. Alternatively, with so many priorities and so much being asked of police officers, it is possible that "autopilot" may have crept in, diminishing quality of patrols

▶ In-depth tracking of officer activity was not possible, and it is possible that officers were conducting different types of activity during hotspots patrols to during standard allocation to hotspots areas, and this may account for the lack of difference in time in the hotspots (e.g. taking a statement in the area would place an officer in the hotspot for a long time, possibly as much as three patrols)

▶ Low base rates of crime make it difficult to prevent offences, as officers need to be seen by the people who would commit the offences to create a deterrent effect, a factor that would compound impact of low experience or training in proactive and visible patrol methods

▶ Whilst the larger hotspots do have higher prevalence of crime, and are contiguous areas that make sense for patrol, they may be more difficult to patrol effectively due to size, and therefore the requirement for officer training and experience may be multiplied if effective prevention is to be seen

What have we learned overall?

Whilst it is clear that crime is concentrated in some places more than others, and it is likely, with the right intervention for the local context and crime rate, that hotspots policing will have an effect on reduction of crime in the UK, it does not appear that US approaches to hotspots policing work in quite the same way in the UK.

We need to design interventions around the context, geography and crime rate that we are working within. It is important that in-depth analysis of the types of crimes, timings of crimes, and problem solving around where and when crimes are committed is conducted to allow us to test more approaches to crime prevention at place.

Based on this research and other findings from within this What Works series, it would also be worth testing in-depth problem solving at place (Problem Oriented Policing) to attempt to identify key drivers of crime at these places, and put in place long-term interventions to solve them. This would allow for testing of interventions that do not require the presence of a patrol resource to coincide with the presence of a person who may go on to commit an offence, something that would be incredibly valuable in areas where, although concentrated, the crime rate is not extremely high

WHAT WORKS

What is hotspots policing?

> Crime occurs in some places more than others, and it is well evidenced that there are some small geographic areas which account for large proportions of all crime that occurs. Hotspot is a term for small geographic areas that have been identified as having a high concentration of crime, and hotspots policing is a term for a tactical approach to crime prevention where police officers are deployed to hotspots to patrol the area and act as a visible deterrent to prevent crime being committed.

Hotspots policing involves a few stages:

1 Identifying areas where crime occurrences, that can be prevented by the type of activity that is proposed, are concentrated in geographic spaces

2 Conduct some data-led problem solving to identify tactics that may be used to reduce or prevent the crimes that are being committed. It is important to work out at this stage whether you believe that the types of crimes that are being committed are likely to be preventable by a visible deterrent

3 Design an intervention around the problems that are present in the areas you have identified, this usually fits into one of two broad areas;

   a) Directed visible patrols and proactive policing activity. This is what is being tested in the interventions outlined in this paper, and relies on the assumption that the types of crimes that are occurring may be preventable by people seeing a police officer in the area, believing they are more likely to be caught if they offend, and therefore being deterred from offending. There is also an element of this approach that may reduce offending by intervening proactively through tactics such as stop and search, or through arrest of potential offenders who are already wanted for commission of other offences

   b) Problem-oriented policing approaches, where a data-led problem solving approach is taken to identify ways in which changes can be introduced to address reasons why crime may be concentrated at those places more than at others. This may involve multi-agency collaboration to reduce risks in the area.

4 Track delivery of the intervention to ensure that it is being conducted as desired

5 Measure the impact of the intervention in terms of the level of crime that is being committed in those spaces, ideally through use of a randomised trial

Whilst there is a lot of evidence that this approach can be effective in US cities, it has not been well tested in the UK, especially in areas that are not large cities. There are also a lot of different tactics that have been examined under an umbrella term of hotspots policing, so it is difficult to establish which tactics work better than others in which types of geographic areas. Therefore it was necessary to conduct tests of this approach in the Thames Valley to establish whether it was likely to be an effective tactic for crime prevention, and what methods might work best.

WHAT WORKS

Methodology – Trial One

> **Trial One was designed to test the best available evidence from previous experiments of patrol-based hotspots policing interventions.**
>
> **Hotspots were kept small enough that officers could be seen from the whole hotspot during most points of the patrol, and patrols were required to be performed on foot, by a visible police officer, for a duration of at least 13 minutes.**
>
> **A novel approach to tasking of officers was taken, by using a mobile phone based application to direct officers to specific hotspots.**

Does the traditional best evidence translate to the Thames Valley?

This trial was implemented between September 2021 and March 2022, and to avoid seasonal variations, data from these months in years between 2016 and 2020 were used to identify spaces where crime was concentrated. Data from 2020 to 2021 were not used, due to the unknown effects of lockdowns during the COVID-19 pandemic.

The dataset comprised all non-domestic violent acts, ranging from public order offences to murder, as the aim was to reduce level of violence and it was decided that due to many domestic violence offences occurring in private dwellings, these should be removed as they would be less preventable through patrol.

There were 58,959 offences that could be geo-located onto a map, and these were split into daytime offences (from 08:00 to 19:59) and nighttime offences (from 20:00 to 07:59) as it was hypothesised that locations may be different in the day from in the evening. Once the hotspots were identified it was clear that all of the day and night hotspots were in different areas, which supported this decision.

Consistent with previous evidence, hotspot size was kept consistent, and all crimes were grouped into hexagons where the length of each edge was 150m. This provided the best possible balance of consistency with existing evidence with prevalence of crime. These hotspots had an area approximately the same size as seven football pitches, and multiple methods (including clustering and optimised hot spot analysis) were examined to ensure the locations were consistently identified, and the top 50 hotspots for days and nights (100 in total) were manually examined.

Hexagons which included hospitals, prisons or schools were removed, as the majority of crimes in these hotspots were likely to have occurred indoors and would not be preventable through patrols.

A 75m buffer zone was added to each hotspot so that they did not overlap in terms of treatment, and the hotspots were sanity checked to ensure that they remained consistent over time and did not relate to time-limited events such as Reading Festival.

WHAT WORKS

All hotspots were then manually manipulated (rotated and/or nudged spatially) to ensure that there were no overlapping buffer areas, areas such as dual carriageways which could not be patrolled were removed, and the incident inclusion was maximised. This ensured that hotspots were in the most appropriate places, not just where the tessellation of original hexagons had originally placed them, and this process resulted in identification of 45 hotspots (19 for days, and 26 for nights). These hotspots were almost exclusively located in the centre of cities or towns across the Thames Valley, or in other areas of high footfall such as shopping streets or areas with many bars and restaurants. They were generally areas with high levels of night-time economy activity. Few hotspots were located in primarily residential areas; where this happened it was either due to density of housing, or the presence of shops or businesses. Most towns and cities had between two and five hotspots, and an example hotspot can be seen in figure 3.

Joint Operations Unit (JOU) officers were identified as being a police resource that were equipped to travel anywhere in the police force area. JOU comprises roads policing unit, firearms capability, operational support, canine unit, and mounted unit. They are a flexible resource who share a command structure, and this was important to allow us to test the impact of directed patrols to hotspots which were spread out across the entirety of the Thames Valley, the largest non-metropolitan police force in the United Kingdom, which comprises three counties and an area of over 2,200 square miles.

A mobile phone-based application was designed in-house as the mechanism to direct officers to hotspot locations for patrols to be conducted. This research team were aware that other areas had solved the tasking problem through use of control room resources to direct officers, though this would have been extremely expensive, and the idea of this trial was to test an approach that would be possible in the long term and that did not increase costs of policing.

The hotspots were pre-randomised, so that half were available to patrol each day, and the hotspots that were identified for treatment were visible in the application when an officer logged in on their mobile phone. Officers could choose from the available treatment hotspots, and would then select the hotspot they were about to patrol. Figure 4 shows what officers would see when they selected a hotspot to patrol, and figure 5 shows a view of a hotspot in more detail which the officer would be shown by clicking on the map.

When officers started their patrol in a hotspot, they clicked a button to start recording of the patrol, and a timer popped up to show them how long they had been patrolling. This timer turned amber at 13 minutes and then green at 15 minutes to incorporate a nudge effect in order to encourage officers to conduct patrols that were at least 13 minutes in length. When they finished their patrol, they pressed a button in the application and the patrol was recorded. Location data was recorded for the start and end of the patrol, and archive data from Airwave radios was also collected for the hotspot areas, so that level of patrols could be examined and tracked.

Figure 3. An example of a hotspot from Trial One

Figure 4. Screenshot from the hotspots app, showing the overview of a hotspot

Figure 5. Screenshot from the hotspots app, showing a detailed view of a hotspot

Findings – Trial One

Tasking via a mobile phone application

Over 3,500 additional patrols of at least 13 minutes in length were conducted through using the application. This was an average of 1.255 patrols per treatment hotspot per day. However, patrols were more prevalent on day shifts (2.01 patrols per shift on average) than on night shifts (0.71 patrols per shift on average).

There was more activity by Joint Operations Unit officers in hotspots on treatment days than on control days; the application did work for directing forcewide resources to specific patrol areas. But, as seen in figure 6, even though there was a 93% increase in JOU patrols, this only led to a 19% increase in overall activity due to high baseline activity (hotspots were already being patrolled). Both of these increases were statistically significant. The overall differences in patrol levels and Airwave radio activity can be found in table 7 below.
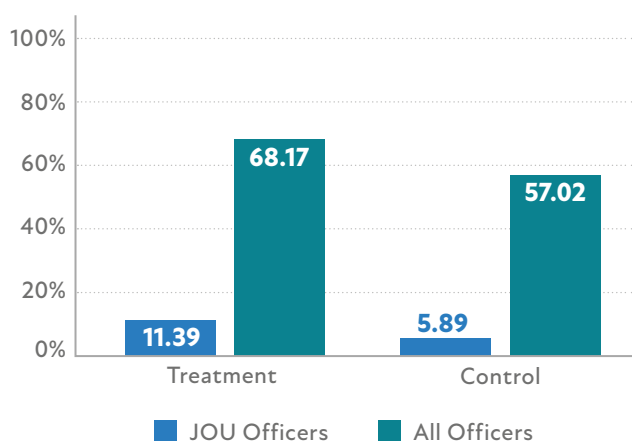

Figure 6. Activity in hotspots as measured by Airwave radio pings, compared between treatment and control days

	Treatment	Control	t / X	p	Effect size	Type
Sample size (location-days)	2874	2886				
Mean full patrols	1.255	0.018	46.714	<0.0001	1.231	t-test
Mean reported patrols	1.345	0.020	48.319	<0.0001	1.273	t-test
Mean Airwave Pings by JOU	11.385	5.892	18.76	<0.0001	0.494	t-test
Mean Airwave Pings by other	56.780	51.131	1.784	0.075	0.047	t-test
Mean Total Airwave Pings	68.166	57.023	3.431	<0.001	0.090	t-test

Figure 7. Differences in patrols and Airwave radio pings between treatment and control hotspot-days

▶ **Tasking officers via a mobile phone application did direct additional patrols effectively from roaming resources who could patrol anywhere in the force area, and did create a large amount of additional hotspots patrols that would not otherwise have occurred.**

As can be clearly seen in figure 8, use of a nudge approach through changing the colour of the numbers on the patrol timer in the mobile phone app led to patrols being reliably of the desired length, with the vast majority of patrols being of at least 15 minutes in duration.
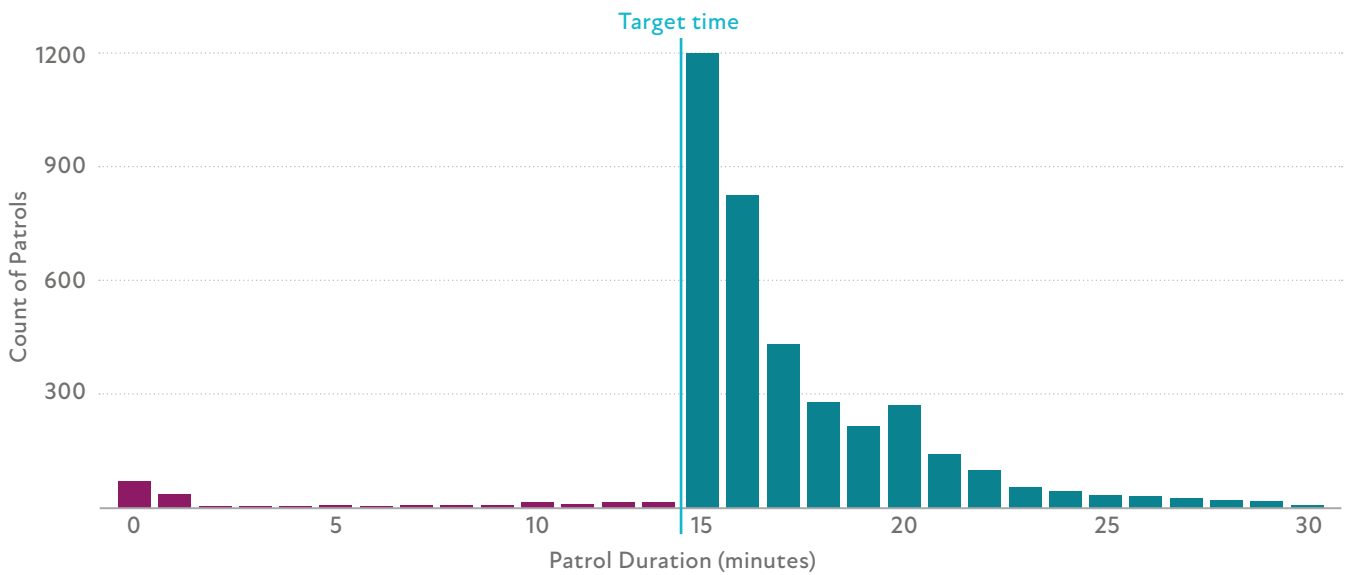

Figure 8. Distribution of patrol length

▶ **Use of a nudge mechanism to prompt officers to remain patrolling until the timer changed colour appears to have worked incredibly well, with the vast majority of patrols being of 15 minutes or longer.**

However, whilst there was indication that crime prevalence in hotspots reduced by 8.74% on treatment days, this is not significant and is of much lower levels than have been seen in US trials. The levels of overall crime, violent crime, and violent and sexual crime on treatment and control days can be seen in the table at figure 9 below.

	Treatment	Control	t / X	p	Effect size	Type
Sample size (location-days)	2874	2886				
Violent Crime						
Prevalence Count	359	407				
Prevalence Percentage	12.49%	14.10%	-3.104	0.078	0.046	chi-squared
Mean count per location-day	0.191	0.209	-1.132	0.258	0.030	t-test
mean CCHI per location-day	12.787	13.997	-0.391	0.696	0.010	t-test
Violent Crime inc. sexual	373	422				
Prevalence Count	12.98%	14.62%	3.1342	0.07667	0.0467	chi-squared
Mean count per location-day	0.2011134	0.2200277	1.1276	0.2595	0.0297	t-test
mean CCHI per location-day	17.87926	16.69109	-0.30684d	0.759	-0.0081	t-test
All Crime						
Prevalence Count	825	846				
Prevalence Percentage	28.71%	29.31%	0.230	0.632	0.013	chi-squared
Mean count per location-day	0.462	0.485	0.924	0.356	0.024	t-test
mean CCHI per location-day	20.026	19.963	-0.015	0.988	-0.000	t-test

Figure 9. Differences in crime between treatment and control days

> **Whilst this approach did show promise, and was a sufficiently large trial to expect to show an effect if one was present, the decrease in crime prevalence that was seen was not statistically significant.**

These hotspots followed best evidence from successful US trials, but across the 5,760 hotspot days (45 hotspots x 128 days) that were allocated to either treatment or control during this trial, there was a low rate of offence commission overall. This equates to one crime of any type every two days, and one violent offence on average every five days.

> **Whilst hotspots policing shows promise in relation to crime prevention, the best practice in the US is not what works for Thames Valley and similar areas of the UK, but mobile phone applications can be incredibly effective in directing patrols.**

What do the findings from Trial One mean?

> **Use of a mobile phone application has been demonstrated to be an effective mechanism of delivering a hotspots policing approach with minimal administrative cost burden.**

The mobile phone application provided an extremely effective way of tasking officers to complete patrols, without requiring additional resourcing that was not delivering the patrols. The use of the application with officers who patrolled the entirety of the police force area allowed for additional patrols to be conducted that would have been much less likely to occur without the application. In addition, the application was very well received by JOU officers as it was viewed as allowing their proactive activity to be recorded.

The nudge effect of changing the colour of the timer when officers have patrolled for an appropriate length of time appears to have been incredibly effective in encouraging patrols of the desired length, and this is something that can be considered as an approach whenever tasking activity in other trials and implementations.

The application has been released for use by other UK police forces, so that it will be available for use by any agency that is wanting to task officers to hotspots in this way.

> **Whilst non-significant, there was a decrease in crime seen as part of this trial, indicating that the approach of directing Joint Operations Unit officers to hotspots of violent crime shows promise, and this is likely due to the US approach to designing hotspots not being well suited to non-metropolitan areas of the UK, likely due to low rates of crime commission in the areas that were identified.**

Regular tracking of officer activity via Airwave radio data allowed for the experimental delivery to be tracked. This was incredibly important, and allowed for some level of tracking of activity without need for additional resourcing or equipment, as other trials often use control room resources or additional GPS trackers, which can both be expensive.

There was a greater level of patrolling on day shifts than on late or night shifts, and this may have limited the effectiveness in terms of crime prevention. However, this may indicate a limitation of resource availability later in the day.

It was useful to commence the testing of hotspots policing in the Thames Valley by using small micro-hotspots, consistent with best evidence from previous trials. This approach of using best evidence to inform our decisions when designing interventions allows us to establish what works contextually.

WHAT WORKS

Further testing is needed, and a new approach to design of hotspots should be used. It is important that hotspots contain sufficient crime to be preventable by an occasional resource, and at the same time there needs to be a way by which the patrol could realistically impact on the types of crime that are desired to be prevented.

Whilst these findings were incredibly promising, and have demonstrated that the use of an application is a sound method for tasking of patrols, the hotspot size and crime density were not optimal. In addition, whilst the use of experienced officers who are regularly proactive was likely to have aided delivery and performance of the patrols, the number of officers available likely limited the overall level of patrol activity and it would be useful to assess the method as a whole force implementation, with all officers being able to conduct patrols via the application.

Methodology – Trial Two

> **Trial Two was designed to test new hypotheses that were gained through the findings from Trial One, to work out whether new, larger patrol areas which accounted for a higher proportion of crime would be effective for patrol-based hotspots policing interventions.**
>
> **Hotspots were created as contiguous areas which made sense in terms of the geography of the area, and patrols were required to be performed on foot, by a visible police officer, for a duration of at least 13 minutes.**
>
> **The novel approach to tasking of officers by using a mobile phone based application to direct officers to specific hotspots was rolled out to all officers in Thames Valley Police in an attempt to test a force-wide rollout of the implementation.**

How does this learning from Trial One change the crime-related outcomes in the Thames Valley?

This trial was implemented between April 2023 to November 2023, and data from years between 2016 and 2022 were used to identify spaces where crime was concentrated. Data from 2020 to 2021 were not used, due to the unknown effects of lockdowns during the COVID-19 pandemic

The dataset comprised all non-domestic violent acts, ranging from public order offences to murder, as the aim was to reduce level of violence and it was decided that due to many domestic violence offences occurring in private dwellings, these should be removed as they would be less preventable through patrol.

The method of identifying hotspot hexagons was the same as in Trial One. However, when it came time to identify larger areas, hotspots that accounted for 30% of violent crime were identified, and a heatmap was applied to the hexagons. Areas where there was a concentration of these hexagons were then identified, and the geography of those areas was examined to identify areas that made sense as patrol routes, as well as incorporating large proportions of crime.

During the identification of wider areas, all of the crime data was used to identify where there might be locations of crime commission that were just outside the area. A professional judgement was made by our mapping specialist and head of research in order to balance the size of the hotspot with the proportion of crime that occurs within it

Some areas were too large to create as a single patrol area, but would have bordered each other had they been split, so multiple patrol areas were created within a hotspot. All patrol areas were randomised together, so that there would be no crossover impact between patrols. In addition, there were some areas where the area of the hotspot with the highest crime rate was where the two patrol areas met, and where this was the case, an overlap was created to ensure the highest crime part of the hotspot received the most policing through being patrolled in both areas

WHAT WORKS

Figure 10 shows an example of a hotspot with one patrol area from Trial Two, and figure 11 shows two examples of hotspots with more than one patrol area from Trial Two, one where the area with the highest concentration of crime was in the middle of the hotspot and therefore the patrol areas were created with an overlap, and one with disparate patrol areas due to the most concentrated areas being spread across the hotspot area
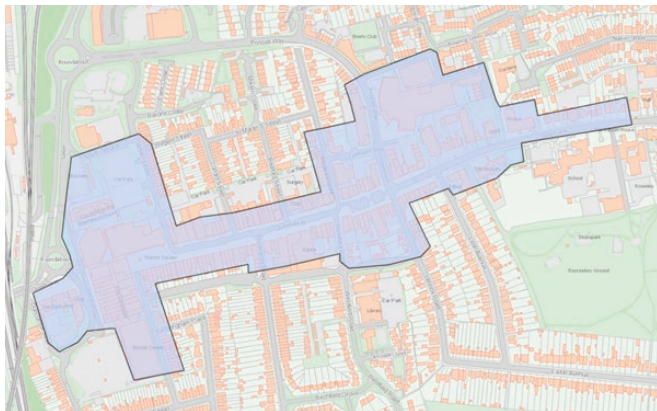

Figure 10. Example of a hotspot with one patrol area from Trial Two

Figure 11a. Example of a hotspot with more than one patrol area from Trial two, which had overlapping patrol areas
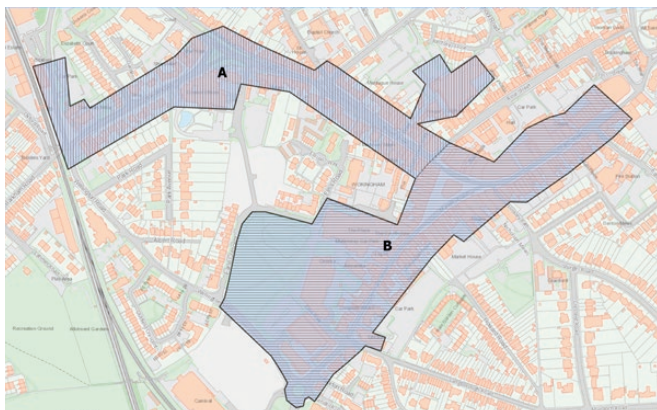

Figure 11b. Example of a hotspot with more than one patrol area from Trial two, which had disparate patrol areas

Thirty-four hotspots were created, with 67 patrol areas in total, and 17 were randomly assigned through pre-randomisation to treatment each day. The day-night allocation was not used, instead examining the temporal breakdown of offences in each location, and where there were hours of the day (often in the morning) where there were no offences, the hotspot would not be available for patrol at that time. It was important that officers would believe in the method of identifying the hotspots, so this element allowed us to demonstrate that we were only getting officers to patrol at times where crimes were being committed.

The mobile phone application was opened up to all police officers and PCSOs in the Thames Valley, and officers in local policing areas were only presented with hotspots that were in their areas, allowing them to patrol as part of the implementation, without leaving their policing area.

During the delivery of this trial, the availability of Airwave data became limited and so it was no longer possible to use it for regular delivery tracking, but only for after-the-fact analysis at the end of the trial. Interim analysis was conducted after six months of implementation, and following review of the findings from the interim analysis, the experimental delivery was terminated due to lack of any change in levels of crime. The experiment ran from April 2023 to November 2023.

Findings – Trial Two

It was possible to use hotspots identification techniques alongside local knowledge and geographical awareness to design larger contiguous areas where crime is concentrated. This novel method of creating hotspots did incorporate higher frequency of crime, with 1.7 crimes per hotspot per day on average. But this is still very low rates of crime, and when looking at violent crimes this decreased to 0.53 crimes per hotspot per day on average.

These 34 areas cover just 0.2% of the force area, but contain 26.3% of the serious violence that was committed in Thames Valley, demonstrating how concentrated a lot of crime is in the Thames Valley, as in other areas.

However, despite the high concentration of crime, higher prevalence of crime, and contiguous patrol areas that make sense for the Thames Valley, there was no change in crime rate due to hotspot patrols. Figure 12 below shows the average levels of crime per hotspot per day on control and treatment days, for all non-police initiated crime and for violent crime, and there is no difference in either.
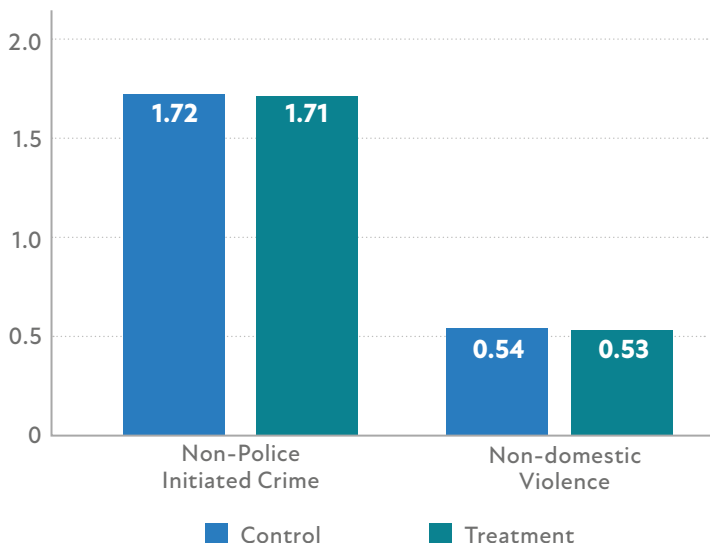

Figure 12. Crime rates for non-police initiated crimes and non-domestic violence between treatment and control days

There were 17,794 patrols recorded in the mobile phone application over seven months, but there was no difference in Airwave radio activity between treatment and control days.

There was also no difference at all in stop and search rates between treatment and control days.

One-sided tracking of patrols (through the application only) does not seem to be sufficient to run a rigorous trial. Inability to track activity regularly using Airwave radio data meant that the lack of difference in Airwave activity was not picked up until later.

What do the findings from Trial Two mean?

> Redesign of the hotspots identification method allowed for creation of hotspots that make sense for Thames Valley; increasing the rate of crime that is seen in the hotspots, and allowing for identification of only 34 areas comprising 0.2% of the police force area within which over a quarter of all violent crime occurs.

The lack of difference in both stop and search rate and Airwave radio activity between test and control area indicates that there has been a problem with delivery of this trial. It is possible that Airwave radio activity could have been similar just due to the level of activity of officers attending locations to take statements and investigate crime, alongside general patrol activities. This would also create an impact on patrol delivery, as on days that were very busy with investigations and offences, more statements would be required, but fewer officers would be available for conducting patrols. Therefore it is possible that there was already such a high level of activity in these areas that the application didn't change the activity, just allowed officers to record it on treatment days, or that the additional level of patrol was just too small, a drop in the ocean.

However, the stop and search rate was examined as a measure of proactive activity. Whilst an imperfect measure, it is likely that if proactive patrols are being conducted effectively, that officers may encounter a person who they would suspect sufficiently to conduct a search. It is possible that experience level of officers following COVID-19 lockdowns may have impacted efficacy of patrols, and more training would be beneficial. Alternatively, with so many priorities and so much being asked of police officers, it is possible that "autopilot" may have crept in, diminishing quality of patrols. These may have explained the lack of difference in stop and search rates.

It is also possible that local officers learned where the hotspots were through the experiment and started patrolling them regardless of whether they appeared in the application. This may well be a side effect of using officers with local ties rather than officers who have a more generalised roaming role, as knowledge that an area is associated with more crime is a motivating factor in wanting to make that area safer, especially for officers who care deeply about prevention of harm in their local areas. This might suggest that it is better to conduct experimental implementations using officers who are not local to areas, before rolling out to local officers to deliver the intervention if found to work.

In depth tracking of officer activity was not possible, and it is possible that officers were conducting different types of activity during hotspots patrols to during standard allocation to hotspots areas, and this may account for the lack of difference in time in the hotspots.

Low base rates of crime make it difficult to prevent offences, as officers need to be seen by the people who would commit the offences to create a deterrent effect, a factor that would compound impact of low experience or training in proactive and visible patrol methods. While the crime rate was much larger in Trial Two than in Trial One, the hotspots were also significantly larger, and this might have decreased the likelihood of being seen, thus increasing the requirement for more patrols.

WHAT WORKS

Whilst the larger hotspots do have higher prevalence of crime, and are contiguous areas that make sense for patrol, they may be more difficult to patrol effectively due to size, and therefore the requirement for officer training and experience may be multiplied if effective prevention is to be seen.

Whilst the tracking of officer patrols showed that there had been an extremely high level of patrols conducted, the lack of Airwave radio data during the trial meant that it was not possible to examine the impact of these patrols in terms of actual officer time in the hotspots. This demonstrated that whilst the application did allow for patrols to be tracked on treatment days, we were unable to see whether patrols were also occurring on control days. The application was still incredibly effective at encouraging patrols, but its use by local officers may also have demonstrated where the patrol areas were, thus potentially creating patrols on control days. It would be important to have a mechanism for establishing whether activity is occurring in hotspots on all days when running any future trials.

> **Not being able to access Airwave activity data during the delivery of the trial, and therefore losing the ability to track officer activity made it impossible to identify issues with patrol density during delivery of the trial, this is an incredibly important thing to incorporate into the design of any subsequent trial to assess hotspots policing.**

The hotspot design process appears to be a dramatic improvement, allowing identification of a significant proportion of all violent crime in very few small areas of the force that are efficient to patrol. However, it is likely that it would have been useful to change fewer elements of the trial at the same time. This was not possible to do more slowly due to funding timelines and a desire to test more widely, and it may have been possible to track and adjust the trial had access to Airwave data been available.

WHAT WORKS

Comparisons and overall learning from two randomised trials

It is possible, and effective, to direct police patrols to geographical locations using a mobile phone application. This could be further developed to incorporate other types of activity, and the use of nudge techniques should also be considered for other areas of delivery, whilst being cautious not to encourage gamification at the expense of actual service delivery.

It is also possible to track patrol activity through use of Airwave radio data, and it was shown to be extremely important to use this, or another similar method, to track delivery of patrols. Inability to track delivery of any intervention can undermine delivery, and can result in not being able to discover issues before they are well-developed.

Hotspots policing shows promise in the context of the Thames Valley, the largest non-metropolitan police area in the United Kingdom, but we still need to establish the optimal mechanism for delivering hotspots policing in this context.

It is clear that best evidence in the US does not cleanly translate to the UK context in a non-metropolitan area, and this is important to remember when examining any evidence from different contexts. We should test interventions that have been shown to be effective elsewhere, and we should establish whether they need to be altered or amended. In relation to hotspots policing, it is clear that the use of small micro-hotspots does not provide frequent enough crime to allow for crime prevention of the levels seen elsewhere in the world, and so larger hotspots will be needed. However, it is possible to design those areas as contiguous areas that make sense to patrol, as arbitrary boundaries are not likely to be as effective as boundaries that officers can understand, and that allow problem solving to occur. These larger hotspots were an effective method of identification of areas of extremely high crime concentration.

A greater effect was seen when experienced proactive force resources were allocated to patrol hotspots. It is possible that the difference in training and experience may have played a part in the difference in findings between the two experiments, especially as a large proportion of local frontline resources are relatively young in service. This also raises the question of whether it is better to test geographical interventions with roaming resources, rather than local officers who would be motivated to deliver treatment on control days too, before then rolling out the intervention to local officers once a method is found to work.

Training should be conducted in relation to how to engage members of the public, and how to conduct patrols effectively. Patrols should then be tracked and evaluated in relation to how they have been conducted. It would be possible to do this through qualitative assessment of patrols by use of interviews, or through use of CCTV recordings.

It would be beneficial to examine the impact of additional patrols on different populations, and also the effect of hotspots policing on disproportionality, and this should be conducted along with any further development of hotspots policing approaches.

WHAT WORKS

In-depth problem solving approaches, aimed at developing long lasting solutions to causes of crime at place should also be tested in hotspots. This problem oriented policing would potentially cater more effectively and efficiently for areas of high crime, but where crime is not regular enough to prevent through occasional patrol, especially in areas where officers are patrolling regularly.

> **These two experiments have developed our understanding of how hotspots policing might be conducted in the Thames Valley, and whilst we do not yet know exactly how it works best, we have improved our approach, and further experimentation will allow us to continue to do so.**

WHAT WORKS

Appendix A: Our Approach: The Research Project Lifecycle

In order to avoid some of the pitfalls often associated with public sector research projects, which often lead to not being able to say what works, or what effect has been had for the money or resource invested, we developed the Research Project Lifecycle.

This is a project management approach to running research projects in the public sector, and allows for the research management team to pause at each stage to ensure that it still meets the needs of the organisation, that it is based in best evidence, that it is possible and feasible to run, and that it is well planned, ensuring the best and most ethical test of something that can actually be implemented.

This approach has enabled Thames Valley Violence Prevention Partnership to conduct multiple concurrent high quality interventions, including six randomised controlled trials in a range of different areas.

Embedding a "what works" approach
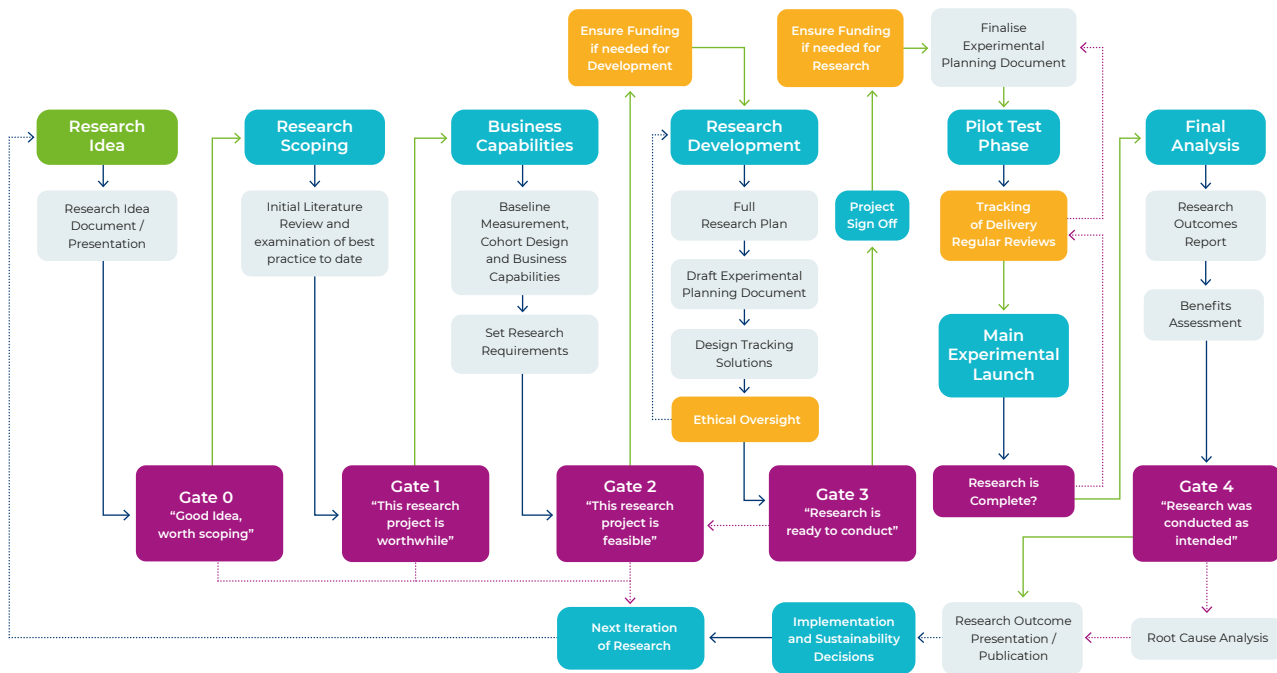
▶ **Reference:** Adapted from Olphin, T.P.A., (2023). *Research Project Lifecycle: A Structured Approach to Conducting Research in the Public Sector, Reading, UK*: Thames Valley Violence Reduction Unit.
© Crown Copyright 2023

Authors and Referencing

Lead Researcher:

Tori Olphin, MBE
Head of Data Science, Research and Evaluation,
Thames Valley Violence Prevention Partnership

To reference, please use:

Olphin, T, Miller, O, Portnell N, Prescott-Mayling, L, James, K, Hewitt, J, Young, C. (2025) What Works Series: Hotspots Policing - Combined findings from two randomised controlled trials of hotspots policing in Thames Valley, Thames Valley Violence Prevention Partnership: Kidlington, UK.
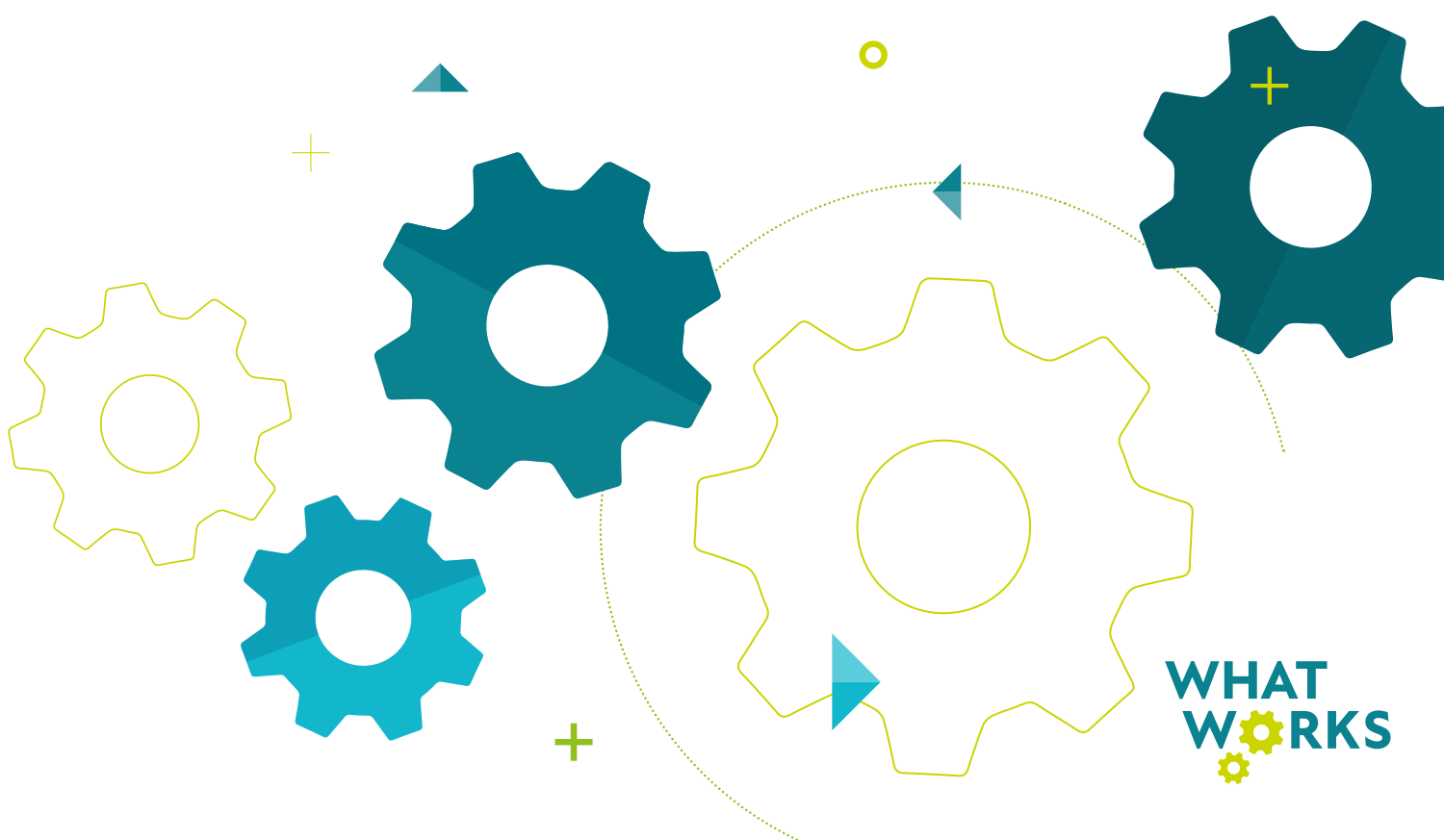
Funding and Acknowledgements

Contact Us

If you have any questions please contact the core programme team via **vpp@thamesvalley.police.uk**

Our website has information on all our projects and evaluations. **www.tvvpp.co.uk**

You can also follow us on X/Twitter **@TV_VPP**