

Violent Crime Hotspot RCT Project Update

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This report provides a response to the findings of the Committee regarding the violent crime hotspot RCT project (hereafter the RCT) following the meeting on the 13th September 2023.

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2 Executive Summary

The points raised in the September Committee meeting are discussed and given the current context it is requested that communication of the findings be undertaken with the caveat that further research is required.

3 Introduction

As the Committee will recall there is a desire on the part of the Home Office to understand the impact of high visibility patrolling, particularly relating to violence with injury crimes. To this end West Midlands Police (WMP) is one of a number of forces receiving funding for a number of areas relating to reducing violent crime, including the use/testing of hotspot patrolling.

As part of this the Home Office requested the identification of hotspots and the randomized allocation of patrols from each of the participating forces. The resulting data have been sent to the Home Office where they will look at all the data from the forces to ascertain the degree to which patrolling reduced the relevant crimes and whether this reduced crimes enough to warrant offsetting the resources used.

It was considered by WMP that this be taken as an opportunity to examine the effectiveness of patrolling which essentially meant analyzing the data (given that the sampling frame and sampling plan had to be produced either way).

Of note is also that the parameters of any ensuing sampling plan follow the advice of the "Cambridge Report" (details in the September Committee report); the major recommendation being the use of a cross-over design whereby each of the hotspots acted as their own control. Another element was the desire of the Home Office that each of the hotspots receive a proportionate split (30-40%) of the extra patrolling v non-extra patrolling days.

The minutes from the September Committee note:

"Violent Crime Hotspot Policing RCT (outcome E – requests more information from the Lab in order to be able to advise)

- Committee members expressed concern about the potential lack of statistical significance of the results presented, and questioned the implications of the use of a 'cross-over' RCT (each area acting as its own control). It was noted that the method used had been determined by the Home Office based on methods recommended by Sherman et al.
- Committee members also raised concern about the exclusion of certain datasets, in particular those relating to the night-time economy, and the short distance for the displacement check.
- The Committee recommended that prior to further use of the report results, that additional models/results are produced using a parallel track RCT method, and including relevant violence data previously excluded from the model, and increasing the length of the displacement check, for comparison to the existing report."

This report aims to provide a discussion around these main points.

4 Main points

4.1 Additional Models / Results be produced using a parallel track RCT method

There are two main issues that arise in terms of cross-over v parallel track designs.

Firstly, in a parallel track design, there is the issue that the control areas do not receive patrols which lead to questions of service provision (and potential ethical issues therefrom) given that they would have to have been violent crime hotspots.

Secondly, every location has some similarities and differences which would be difficult to control for.

There are pros and cons for each approach and the approach taken seemed best placed to answer the question given the circumstances.

Unfortunately, because the design of the RCT was a cross-over design the data gathered could not be analyzed as though it were a parallel track design. Therefore to undertake this would require a further RCT which will not now be possible due to resource constraints.

4.2 Relevant Violence Data Previously Excluded

It is assumed that this relates to the exclusion of certain areas as being hotspots, particularly the night time economy (NTE). This was excluded as the NTE areas are heavily patrolled as a matter of course, thereby not allowing for nights without patrols and therefore it wasn't possible to include them within the sampling plan. Also of note is that NTE was excluded as a part of the hotspot identification stage; at the results analysis stage all violence with injury crimes (excluding DA) were examined.

4.3 Area for Check of Displacement

The Committee raised concerns over the short distance for running displacement checks (notably 50 metres, circa 55% of the hotspots' area). This distance was originally chosen as a buffer zone due to the physical nature of many of the hotspots (being located around intersections of main roads, etc.) and because some of the hotspots would intersect at larger distances. Whilst checks for displacement could be undertaken over wider areas, such checks could be impacted upon by dent of the wider area covered (so leading to a lower number of incidents per square metre). It is also of note that the analysis of hotspots (for both violence and robbery) which covers the whole of the WMP area has not shown any new (violence) hotspots and, following consultation within WMP, the hotspots now number 46 rather than the original 57.

4.4 Potential Lack of Statistical Significance

It is perhaps worth noting that the basic analyses (percentage changes) showed reductions in the occurrence of violent crime and that the majority of the posterior distribution of the relevant estimate for a single effect showed an effect in the direction of interest (namely the greater probability was that the extra patrolling had a negative effect on the occurrence of violent crime).

This was the question of interest to WMP, namely did any effect warrant the extra resources required to undertake the patrols and the answer to that question was found to be yes.

Statistical significance is usually taken as answering a dichotomous question of whether an effect exists or not, this despite the fact that the actual question being answered is 'what is the probability of seeing a statistic as large or larger than that seen (assuming the null hypothesis is true)' as a result of a statistical test (in relation to a p-value). Therefore, many consider this a sub-optimal approach to decision making:

"Let's be clear about what must stop: we should never conclude there is 'no difference' or 'no association' just because a P value is larger than a threshold such as 0.05 or, equivalently, because a confidence interval includes zero."

from 'Scientists rise up against statistical significance; Valentin Amrhein, Sander Greenland, Blake McShane and more than 800 signatories call for an end to hyped claims and the dismissal of possibly crucial effects.' (Nature, 2019)

Ultimately this may be seen as a philosophical view as to the approach taken to assessing data.

5 Conclusion

The resources are not available for WMP to run another RCT. The Home Office is examining the data collected from a number of forces and is using an approach that aims to analyse the effectiveness of hotspot patrolling in relation to the resources used (including an assessment of statistical significance).

Given the current context it is recommended that communication of the project's findings be undertaken with the caveat that further research is required.

References

Amrhein, V., Greenland, S. and McShane, B. (2019). Scientists rise up against statistical significance. *Nature*, [online] 567(7748), pp.305–307. doi:<https://doi.org/10.1038/d41586-019-00857-9>.