OPERATION BECK:

A RANDOMISED CONTROLLED TRIAL ON PROACTIVE POLICING IN LONDON UNDERGROUND PLATFORM HOTSPOTS

CRIMPORT 1.0

INSTRUCTIONS: Please use this form to enter information directly into the WORD document as the protocol for your registration on the Cambridge Criminology Registry of EXperiments in Policing Strategy and Tactics (REX-POST) or the Registry of EXperiments in Correctional Strategy and Tactics (REX-COST).

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1. NAME AND HYPOTHESES

1.1 **Name of Experiment:**

"Operation Beck[1]": A Randomised Controlled Trial on Proactive Policing In LU Platform Hotspots

1.2 **Principal Investigator:**

1.2.1 (Name) Barak Ariel

1.2.2 (Employer) University of Cambridge

1.3 **1st Co-Principal Investigator:**

1.3.1 (Name) Lawrence W. Sherman

1.3.2 (Employer) Universities of Cambridge and Maryland

1.4 **General Hypothesis**:

Police patrol in high-volume hotspots of crimes in London Underground Platforms (hereinafter: "**hotspots**") will reduce crimes reported compared to no police patrol at such hotspots.

1.5 **Specific Hypotheses:**

1.5.1 List all variations of treatment delivery to be tested.

1.5.1.1 patrol of a solo police officer in hotspots

1.5.1.2 patrol of a team (2) police officers in hotspots

1.5.2 List all variations of outcome measures to be tested.

1.5.2.1 Frequency of crimed incidents of 'hard crimes' (i.e., violence, sexual, criminal damage, robbery, public disorder, drugs) and 'soft crimes' (i.e., all other crime categories) in hotspots during the time of experiment (six months 04 Sep 2011 28 Feb 2012);

1.5.2.2 Frequency of all police calls-for-service (incidents) during the time of the experiment (diffusion of benefits)

1.5.2.3 Frequency of crimed incidents and calls-for-service in:

1.5.2.3.1 London Underground stations where the hotspots are located (diffusion of benefits in the catchment areas)

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[1] In memory of Henry Charles Beck (4 June 1902 – 18 September 1974), known as **Harry Beck**, was an English engineering draftsman best known for creating the present distinctive London Underground Tube map in 1931

1.5.2.3.2 opposite direction of Tube Line platform (i.e., westbound versus eastbound or northbound versus southbound) (diffusion of benefits)

1.5.2.3.3 Segments of Tube lines between hotspots (diffusion of benefits)

1.5.2.4 Prevalence of assaults against police officers at hotspots

1.5.2.5 Crime Harm Index

1.5.3 List all subgroups to be tested for all varieties of outcome measures.

1.5.3.1 cluster analysis of hotspots geographically-close to one another

1.5.3.2 General Linear Model (zero inflated Poisson distribution) for the analysis of treatment variation effects in total patrol visits

1.5.3.3 three statistical blocks of platforms, based on natural cutting points within the distribution of the number of crimes (see Appendix I)

1.5.3.4 three statistical blocks of platforms, based on natural cutting points within the distribution of the number of passengers at that LU station

2. ORGANIZATIONAL FRAMEWORK

2.1 **Multi-Agency Partnership:** Operating agencies delivers treatments with independent research organization providing random assignment, data collection, analysis

2.1.1 Name of Operating Agency 1: British Transport Police London Underground (delivery of treatments and crime data collection)

2.1.2 Name of Operating Agency 2: London Underground Ltd. (Travel for London) (passenger-related data collection)

2.1.3 Name of Research Organization: University of Cambridge (analysis)

3. UNIT OF ANALYSIS

3.1 __X__ Places: LU platforms and LU stations

4. ELIGIBILITY CRITERIA

4.1 **Criteria Required**

4.1.1 LU platform

4.1.2 experienced at least two hard crimes, in a 12 months prior, during hot hours (17:00-19:00)

4.2 Criteria for Exclusion

    4.2.1 BTP LU hub stations[2]

    4.2.2 Stations that are too far away and cannot be reached within reasonable travel time[3]

5. PIPELINE: RECRUITMENT OR EXTRACTION OF CASES

5.1 Where will cases come from? BTP LU Crime Analysis Unit

5.2 Who will obtain them? BTP LU Crime Analyst

5.3 How will they be identified? BTP LU call logs

5.4 How will each case be screened for eligibility? Cambridge University

5.5 Who will register the case identifiers prior to random assignment? Cambridge University in conjunction with BTP LU Crime Analyst

5.6 What social relationships must be maintained to keep cases coming?

    5.6.1 Monthly face-to-face meetings between Cambridge University and BTP LU

    5.6.2 Weekly correspondence between Cambridge University and BTP LU

    5.6.3 Prior to experiment, call-takers record will be debriefed and asked to accurately record specific location of crimes on platforms, and specifically if crime occurred on east-, west-, north,- or south-bound trains.

5.7 Has a Phase I (no-control, "dry-run") test of the pipeline and treatment process been conducted?   Yes:

    5.7.1 Laboratory simulation of all experimental cases to address temporal issues and shift patterns.

    5.7.2 Field simulation of a selected group of experimental cases:

        5.7.2.1 how many cases were attempted to be treated: 10 platforms ("Group B" in Appendix I)

        5.7.2.2 how many treatments were successfully delivered: 10 platforms

        5.7.2.3 how many cases were lost during treatment delivery: none.

6 TIMING: CASES COME INTO THE EXPERIMENT IN

    6.7 A single batch assignment **X**

    Alternated every 30 days (see 8.1.1.1.4 below)

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[2] These are stations that are visited by special patrol units as part of a BTP-LU separate ongoing operation. Altogether these are seven stations, excluded prior to random assignment

[3] Measured by the proximity of the excluded hotspot to other patrolled stations. Hotspots excluded post random assignment, given operational infeasibility.

7 RANDOM ASSIGNMENT

7.7 How is random assignment sequence to be generated?

Random numbers case-treatment generator program in secure computer (Cambridge Randomizer) <u>**X**</u>

(See list of participating BTU LU platforms listed in <u>Appendix I</u>)

7.8 Who is entitled to issue random assignments of treatments?

    7.8.2 Role: Principle Investigator (via Cambridge Randomizer)

    7.8.3 Organization: Cambridge University

7.9 How will random assignments be recorded in relation to case registration?

    7.9.2 Name of data base: BTP-RCT

    7.9.3 Location of data entry: Cambridge University

    7.9.4 Persons performing data entry: Dr Barak Ariel

8 TREATMENT AND COMPARISON ELEMENTS

8.1 Experimental or Primary Treatment

    8.1.1 What elements must happen, with dosage level (if measured) indicated.

        8.1.1.1 Element A: 4 visits of 15 minutes (twice on each side of the platform), in total of 60 minutes of police patrol in hotspots during every shift (3PM-11PM), four times a week (Wed.-Sat.).

            8.1.1.1.1 7 double patrols + 6 solo patrols = 13 patrol units

            8.1.1.1.2 54% double patrols + 46% solo patrols = 100% patrols (1:1.174 ratio)

            8.1.1.1.3 Total of 58 platforms in experimental group (given shift times and distances between randomly selected hotspots)

            8.1.1.1.4 solo and double patrols swap on average every 30 days (or until 1:1.174 ratio between double and solo patrols is obtained)

            8.1.1.1.5 each shift = 8 hours (3.5 hrs patrol + 1 hr meal break + 3.5 hrs of patrol)

            with 15 minutes at every hotspot and travelling times between hotspots, each patrol unit can see up 4 or 5 unique hotspots per shift, 4 times per shift, depending on distance between hotspots

            8.1.1.1.6 4 visits per day X 15 minutes = 60 minutes per platform per day (30 minutes in total for each side)

60 minutes / 420 minutes (7 hours of patrol) = 14%

control conditions = 0%

8.1.1.1.7 <u>**Shift Patterns**</u>:

A > B > C > D > E
E > D > C > B > A
A > B > C > D > E
E > D > C > B > A

8.1.1.1.8 4 days a week X 26 weeks (six months of exp't) = 104 days X 58 platforms = 6,032 platform days

6,032 platform days X 4 visits platform per day = 12,064 platform days, for each platform

8.1.1.1.9 20 minutes per hotspot [15 minutes + 5 minute average travel time = 20 minutes per hotspot

20 minutes X 20 visits (10 each side of the platform)= 400 minutes = 6.6 Hours of patrol

+

0.4 hours (24-minutes) cushion for delays and planned construction works (except in Group GG, given greater distance between platforms)

+

1 hour meal break

=

60 minutes / 420 minutes (7 hours of patrol) = 14% presence at hotspots

8.1.2 What elements must *not* happen, with dosage level (if measured) indicated.

8.1.2.1 Element A: more than one police officer in the 1-officer' arm

8.1.2.2 Element C: more than two police officers in the 2-officers' arm

8.2 Control or Secondary Comparison Treatment

8.2.1 What elements must not happen, with dosage level (if measured) indicated.

0% proactive, initiated patrol

9 MEASURING AND MANAGING TREATMENTS

9.1 Measuring

9.1.1 How will treatments be measured? radio control

9.1.2 Who will measure them? BTP LU reporting officers

9.1.3 How will data be collected? BTP LU crime analyst

9.1.4 How will data be stored? BTP LU crime analyst

9.1.5 Will data be audited? Yes, Detective Inspector Mr Keith Webb and Cambridge University

9.1.6 If audited, who will do it? BTP LU Detective Inspector Mr Keith Webb

9.1.7 How will data collection reliability be estimated? Cambridge calculations

9.1.8 Will data collection vary by treatment type? Yes, as above.

9.2 Managing

9.2.1 Who will see the treatment measurement data? management

9.2.2 How often will treatment measures be circulated to key leaders? Monthly

9.2.3 If treatment integrity is challenged, whose responsibility is correction? BTP LU area commander chief superintendent Mr Mark Newton

10 MEASURING AND MONITORING OUTCOMES

10.1 Measuring

10.1.1 How will outcomes be measured?

All X and O in terms of (a) Raw incidents and (b) crimed incidents data, from BTP LU crime analysis database

10.1.2 Who will measure them? BTP LU analyst

10.1.3 How will data be collected? BTP LU analyst

10.1.4 How will data be stored? In BTP LU secured systems.

10.1.5 Will data be audited? Yes,

10.1.6 If audited, who will do it? BTP LU Sergeant Nick Cross

10.1.7 How will data collection reliability be estimated?

Reading of all incident crime call logs during and after the experiment (both treatment and control groups), for measuring accuracy and precision of crime location

10.1.8 Will data collection vary by treatment type? Yes, as above.

10.2 Monitoring

10.2.1 How often will outcome data be monitored? Bi-weekly by Cambridge University

10.2.2 Who will see the outcome monitoring data? Cambridge University

10.2.3 When will outcome measures be circulated to key leaders? Monthly

10.2.4 If experiment finds early significant differences, what procedure is to be followed? Discuss with leaders

11 ANALYSIS PLAN

11.1 Which outcome measure is considered to be the primary indicator of a difference between experimental treatment and comparison group?

11.1.1 Crimed 'hard crimes' incidents frequencies for hotspots

11.1.2 Raw incidents frequencies for hotspots

11.2 Which outcome measure is considered to be the secondary indicator of a difference between experimental treatment and comparison group?

Planned subgroup analyses as defined above

11.3 What is the minimum sample size to be used to analyze outcomes?

11.3.1 Treatment group = 58

11.3.1.1 solo patrols = 29 hotspots

11.3.1.2 Double patrols = 29 hotspots

Swap between hotspots every 30 days, given the 6:7 patrol allocation.

11.3.2 control group = 58 hotspots

11.4 Will all analyses employ an intention-to-treat framework? Yes

11.5 What is the threshold below which the percent Treatment-as-Delivered would be so low as to bar ITT analysis of outcomes? 60%[4]

11.6 Who will do the data analysis? principle investigator

11.7 What statistic will be used to estimate effect size? Cohen's D

11.8 What statistic will be used to calculate P values? t-tests and zero-inflated Poisson distribution, depending on data analysis.

11.9 What is the magnitude of effect needed for a p =.10 difference to have an 80% chance of detection with the projected sample size for the primary outcome measure. d= **0.4** (see <u>appendix II</u> for power calculations)

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[4] However operationally we aim for 95% accuracy.

12 DISSEMINATION PLAN

12.1 What is the date by which the project agrees to file its first report on CCR-RCT? (report of delay, preliminary findings, or final result).

Preliminary findings will be given to stakeholders within 120 days after completion of experiment.

12.2 Does the project agree to file an update every six months from date of first report until date of final report?

Yes.

12.3 Will preliminary and final results be published, in a 250-word abstract, on CCR-RCT as soon as available?

Yes.

12.4 Will CONSORT requirements be met in the final report for the project? (See http://www.consort-statement.org/)

Yes.

12.5 What organizations will need to approve the final report?

Cambridge University will provide any or Aggregated Data it intends to disseminate or transmit to BTP LU, for review, at least 90 days prior to submitting such materials for publication. BTP LU shall then have 90 (ninety) days to respond, provide comments and suggestions based on the said materials, whereas Cambridge University agrees to take under full consideration, at the very least in the way of including such comments and suggestions in the disseminated reports.

12.6 Do all organizations involved agree that a final report shall be published after a maximum review period of six months from the principal investigator's certification of the report as final?

Yes.

12.7 Does principal investigator agree to post any changes in agreements affecting items 12.1 to 12.6 above?

Yes.

12.8 Does principal investigator agree to file a final report within two years of cessation of experimental operations, no matter what happened to the experiment? (e.g., "random assignment broke down after 3 weeks and the experiment was cancelled" or "only 15 cases were referred in the first 12 months and experiment was suspended").

Yes. Save conditions stipulated in 12.5 above.

Appendix I:

Crimes at hotspot	Count in Blocks
7 or above crimes	**27**
Control group	13
Treatment group	14
4-6 crimes	**40**
Control group	22
Treatment group	18
3 or less crimes	**46**
Control group	24
Treatment group	25
Grand Total	**115[5]**

List of participating BTU LU Platforms:

NOT DISCLOSED

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[5] Two stations were dropped from exp't group post random assignment and 1 from control, given operational infeasibility. ITT technique will be used to analyse all cases

Appendix II: Statistical Power Calculation:

t tests – Means: Difference between two independent means (two groups)
Tail(s) = One, Allocation ratio N2/N1 = 1,
α err prob = 0.1, Power (1−β err prob) = 0.8