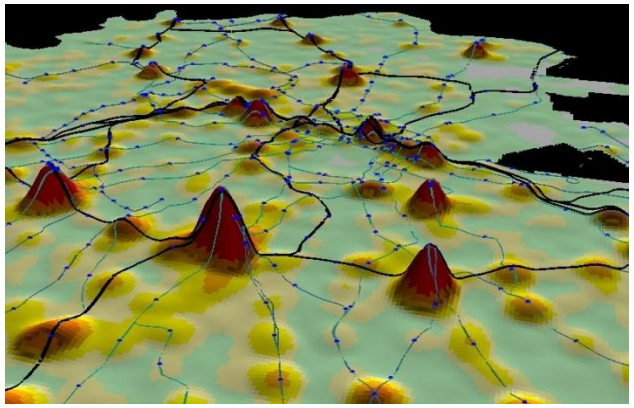
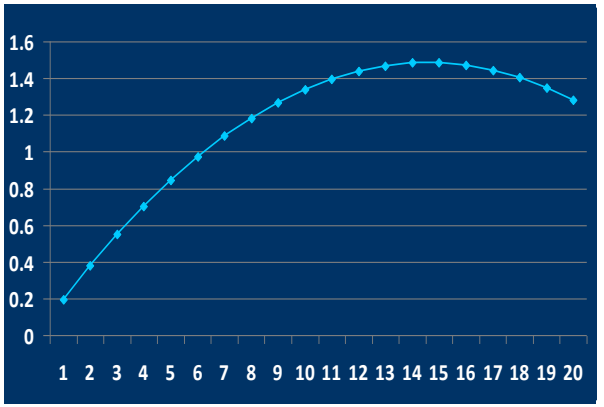
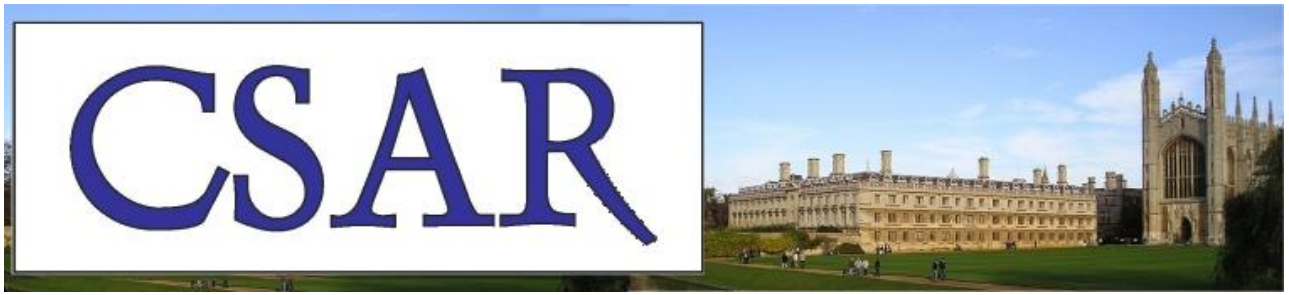




CAN RESEARCH PREVENT CRIME?



50 years

Lawrence W. Sherman

Institute of Criminology, Cambridge University

Jerry Lee Centre of Experimental Criminology

3d February 2014

Founders: Jerry Lee Centre of Experimental Criminology, Cambridge Institute of Criminology

R. A. Butler (1959)

Jerry Lee (2008)

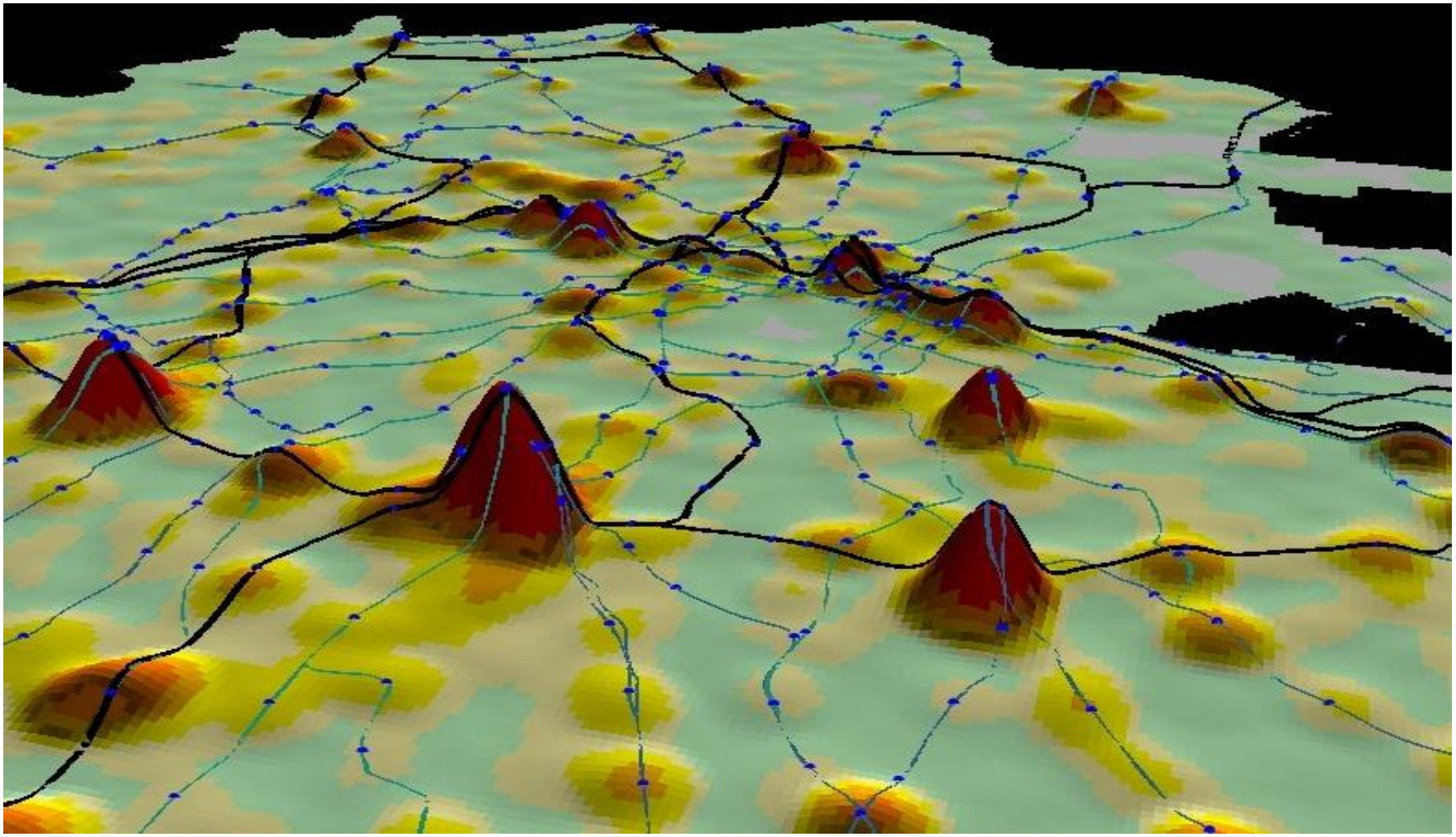
CAMBRIDGE Criminology

CAMBRIDGE Jerry Lee Centre of Experimental Criminology

Acknowledging Our Industry Partners

- Cambridgeshire Constabulary
- Police and Crime Commissioner
  Sir Graham Bright, Dr. D. Gregson CE
- Churchill College graduate Dan Vajzovic,
  Local Policing Commander
- Society of Evidence-Based Policing 2010
- College of Policing 2012
- Police in 35 countries
- UK Prisons, Probation, CPS, Courts

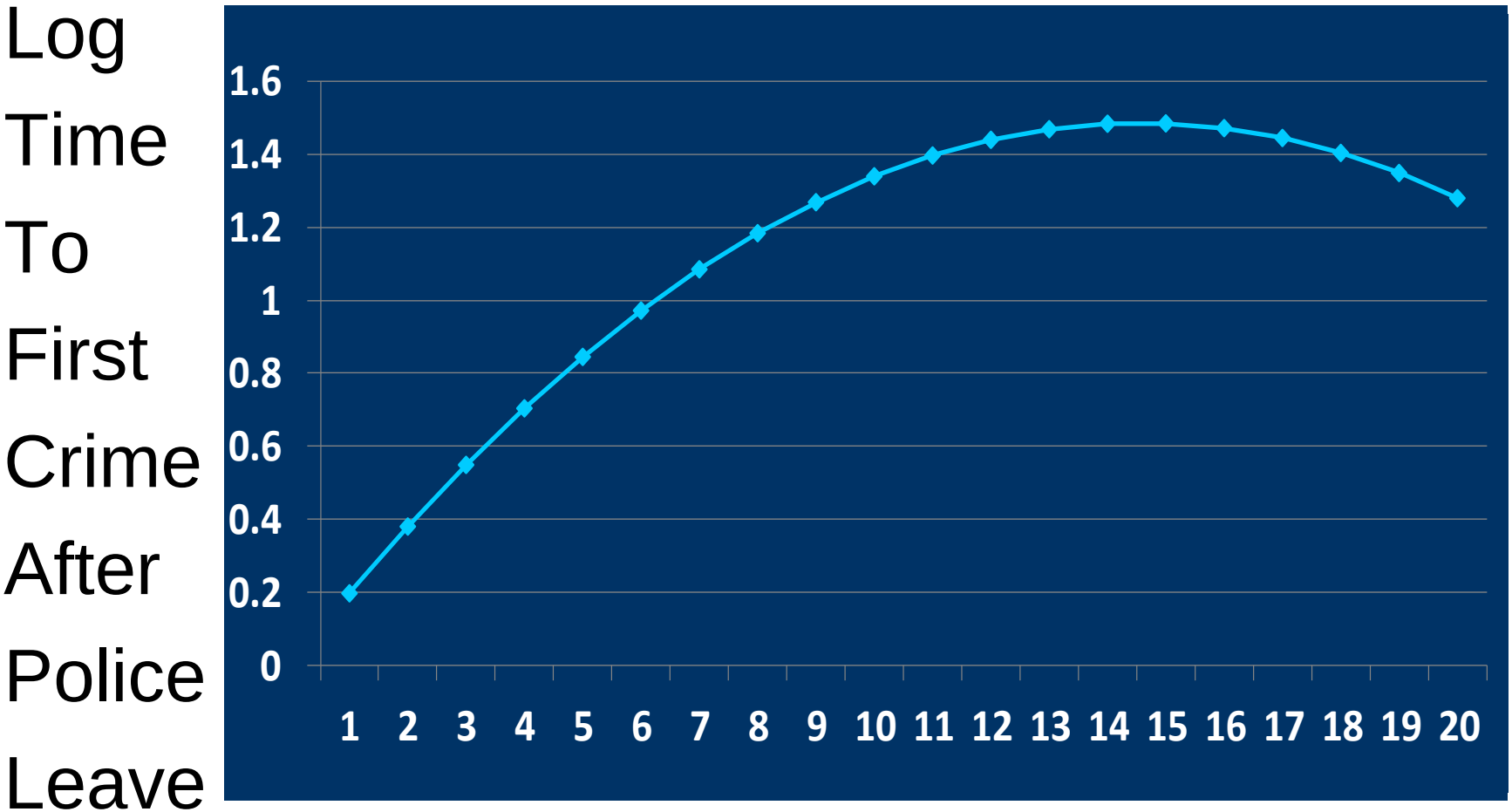
Targeting:
Hot Spots of Violent Crime, Tokyo



Testing:

Residual Deterrent Effects of Police Patrol on Crime in Hot Spots

Maximized by 15 minute periods of patrol presence: The “Koper Curve”

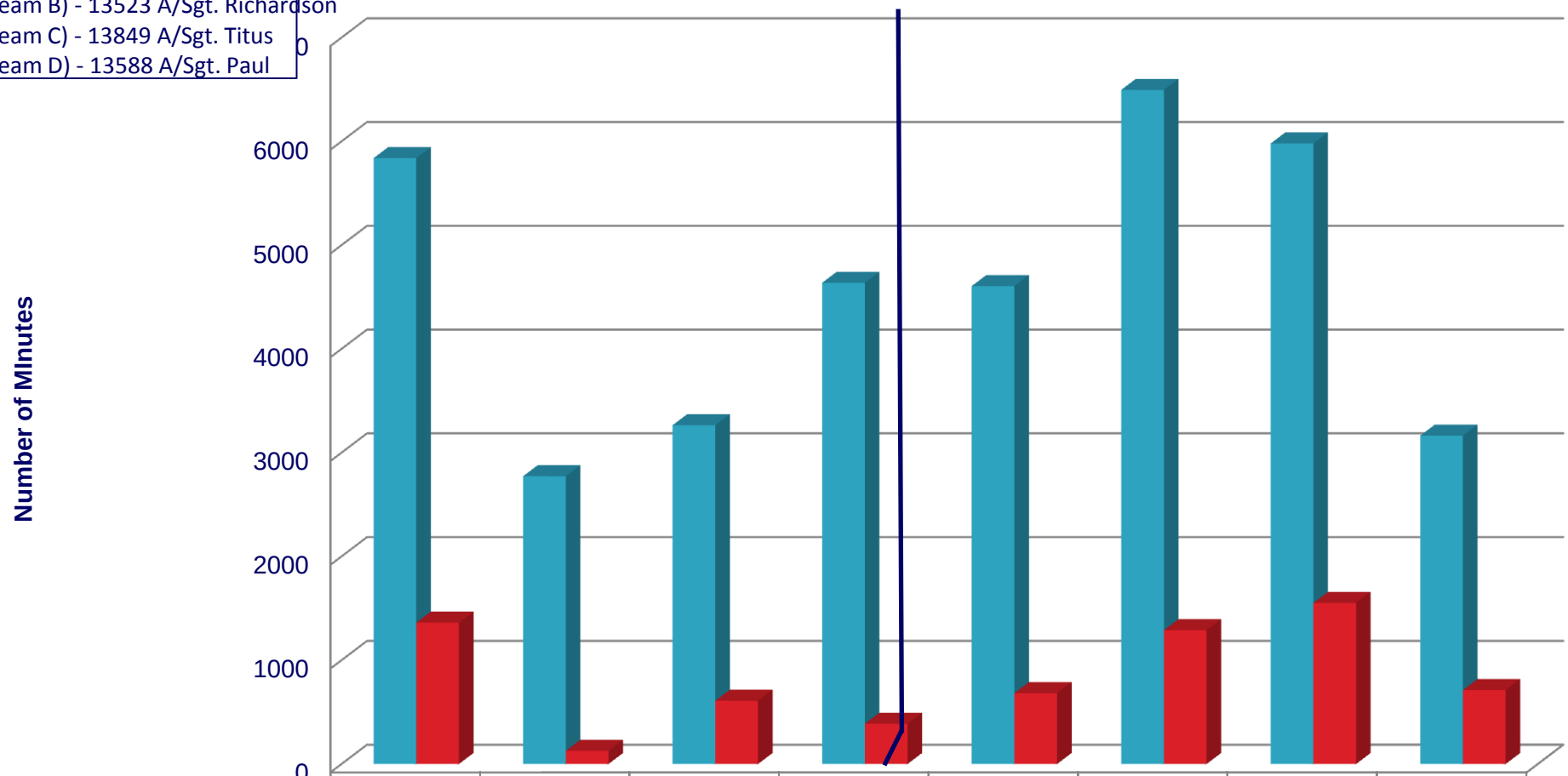


TRACKING

Team Commanders
Team A) - 12487 A/Sgt. Ali
Team B) - 13523 A/Sgt. Richardson
Team C) - 13849 A/Sgt. Titus
Team D) - 13588 A/Sgt. Paul

Ratio of Patrols in and out HotSpots in Minutes

Report Period- 12/1/14 to 25/1/14



	6pm-8am A	6pm-8am B	6pm-8am C	6pm-8am D	8am-6pm A	8am-6pm B	8am-6pm C	8am-6pm D
Total Patrol Time	5838	2773	3265	4637	4605	6496	5980	3164
Total Patrol Geo-fence HS	1362	127	609	388	683	1289	1552	712

How Does Research Prevent Disease?

THE TRIPLE-T STRATEGY for applying research to solve probems

- *Targeting* (epidemiology, concentrations)
- *Testing* (evaluating prevention, response)
- *Tracking* (surveillance: delivery, outcomes)

T-T-T is generalizable to all population management

- Politics (Obama)
- Business customers
- Employees
- Baseball players (“Moneyball”)
- Crimes and criminals
- My focus on “evidence-based policing”

Sherman, 2013 “The Rise of Evidence-Based Policing: Targeting, Testing, Tracking” CRIME AND JUSTICE 42

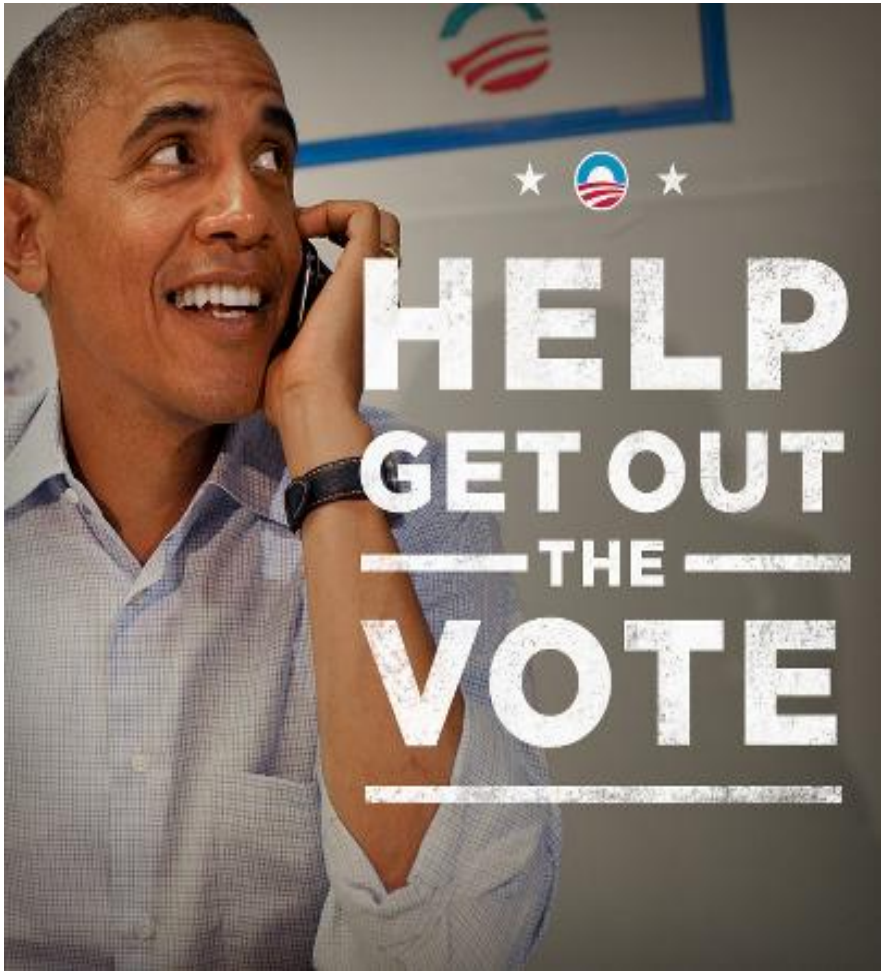
Applying Research to Elections

Obama's Triple-T

Targeting States, Voters

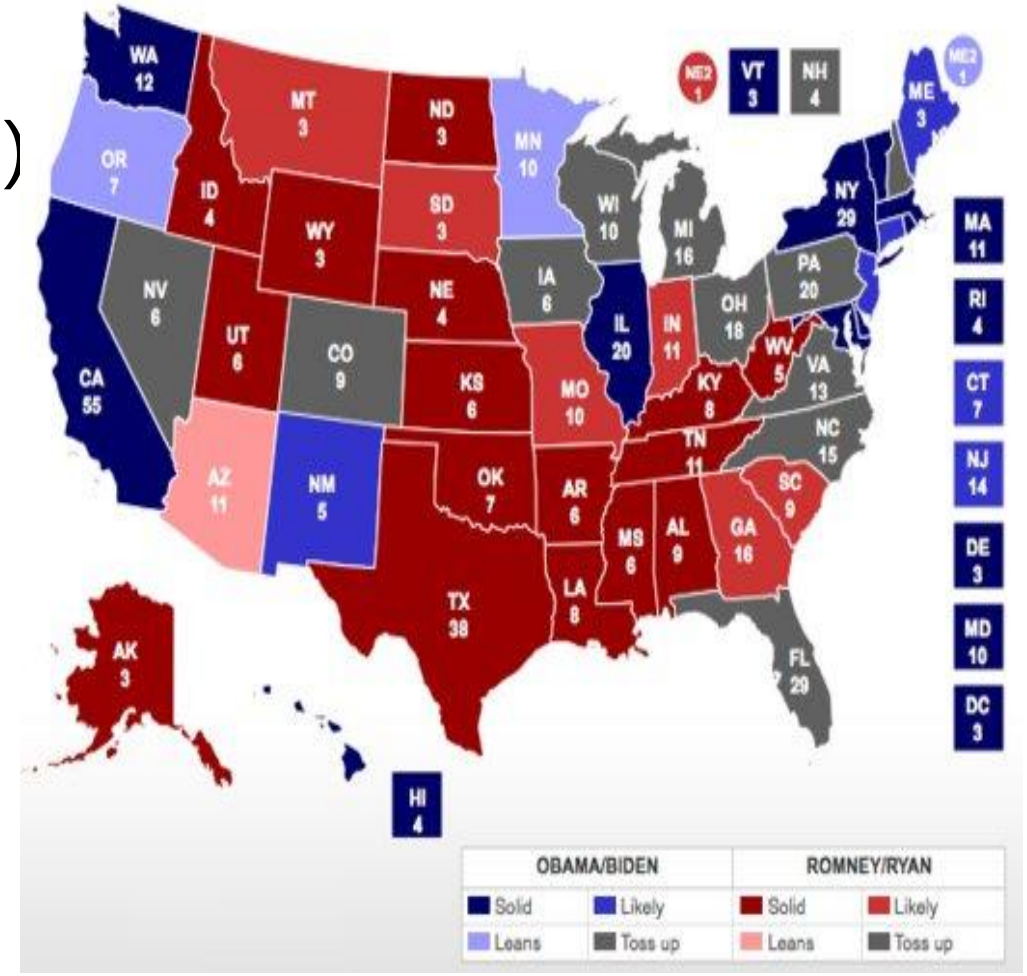
Testing methods, words

Tracking workers, votes



Targets in US Politics

- Electoral College
  (Not Popular Vote)
- Swing States
  (Not solid)
- Donors
- Volunteers
- Organizers
- Core voters
- Undecided voters



Major Crime Example: Policing

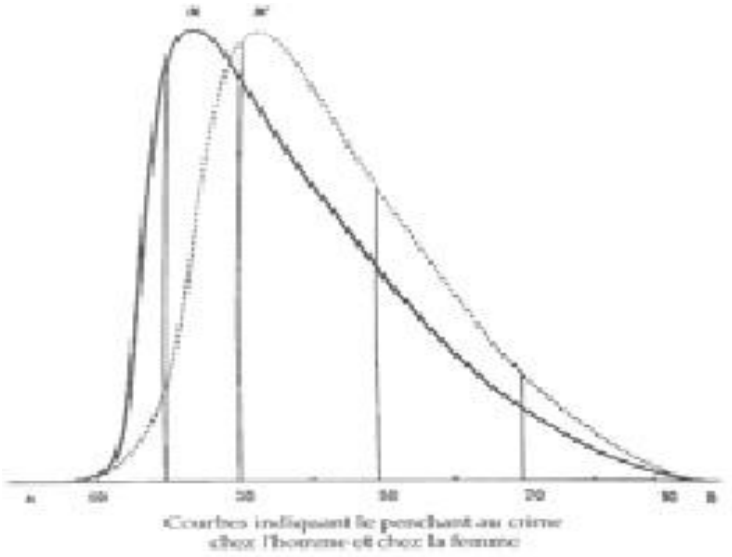
- Targeting: crime analysis
- Testing: police institutions, practices
- Tracking: who is doing what, where, when, and how well? With tested practices?
- From earliest research, application focus
- Yet rise, fall and rise of research in practice
- Other institutions also wax and wane

Targeting Crimes: 1753
Henry Fielding, Criminologist

- Playwright
- Novelist (Tom Jones)
- Magistrate
- Environmental Criminologist
- True founder of criminology?
- 1751 treatise
- Invented UK police

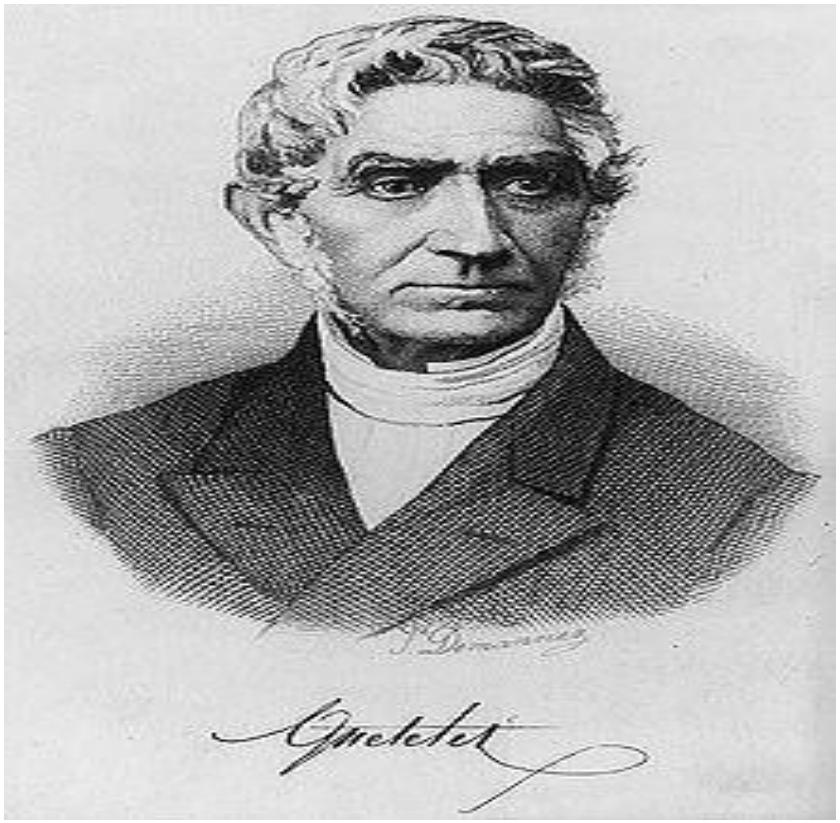
Targeting Criminals: 1819 Age-Crime Curve

- All over the world
- Since 1820s
- first big statistical “discovery”
- Also discovered bell curve—normal distribution
- Little application until 1900s

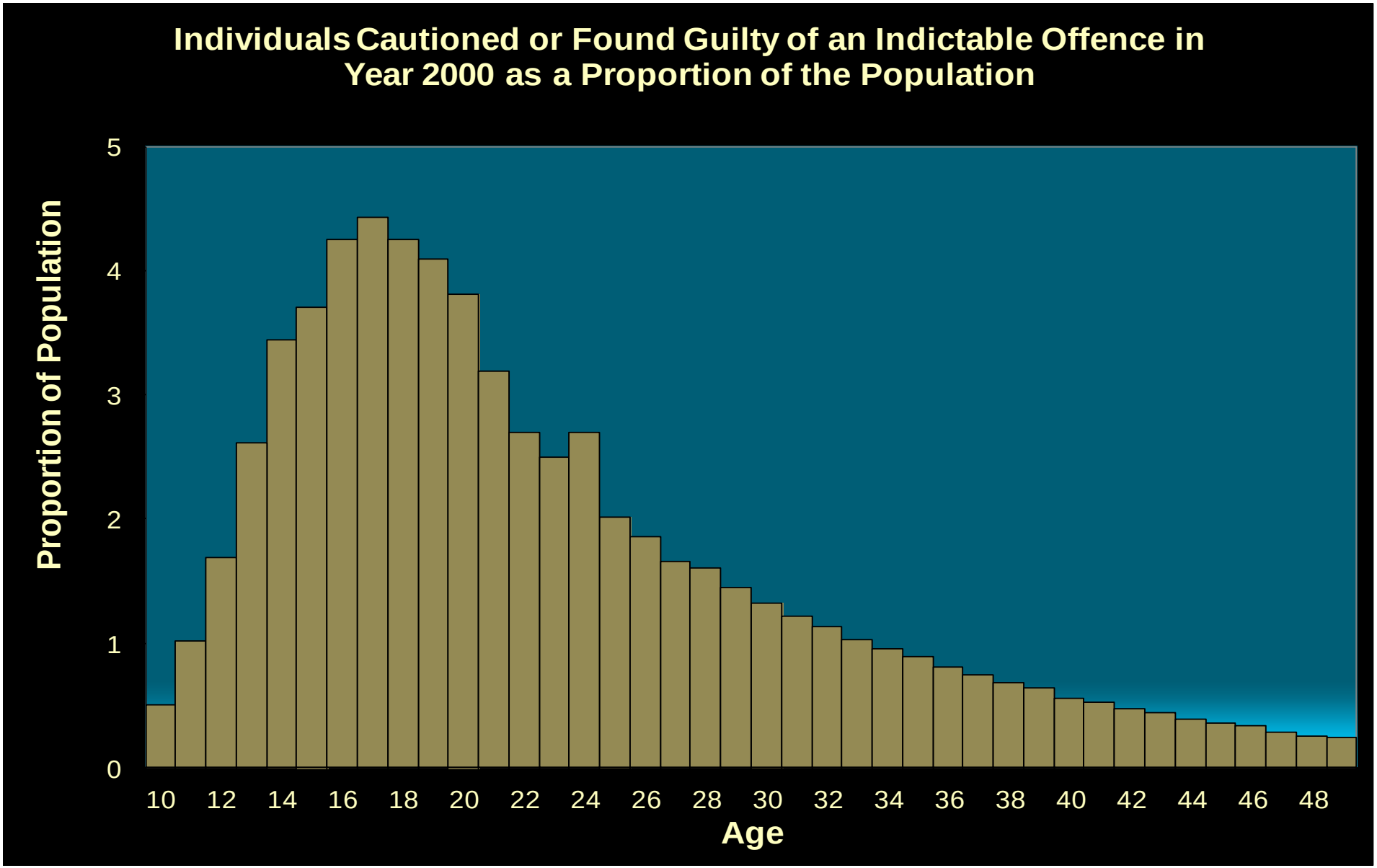


Courbes indiquant le penchant au crime chez l'homme et chez la femme

Adolphe Quetelet



THE AGE - CRIME CURVE FOR ENGLAND & WALES YEAR 2000



Two Main Targets for Crime Prevention

I. Criminal Incidents

Key Dimensions:

What

Where

When

How

Why

N of offenders

N of victims

Severity of harm

Volume of events

II. Individual Criminals

Key Dimensions:

Who

Current age

Age of crime onset

Age of last arrest

What kinds of crimes

Family

Links to co-offenders

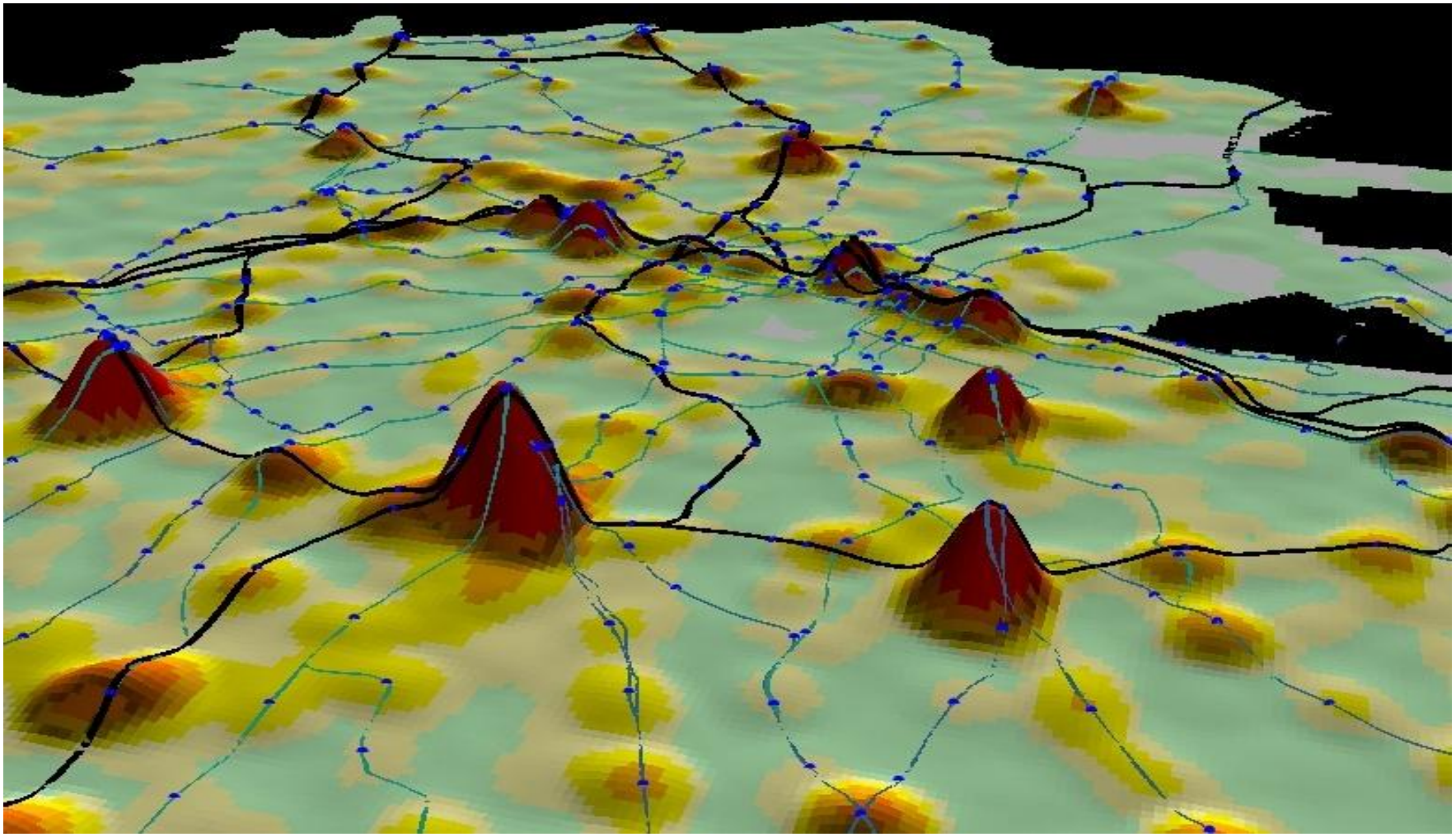
Severity of harm

Volume of events

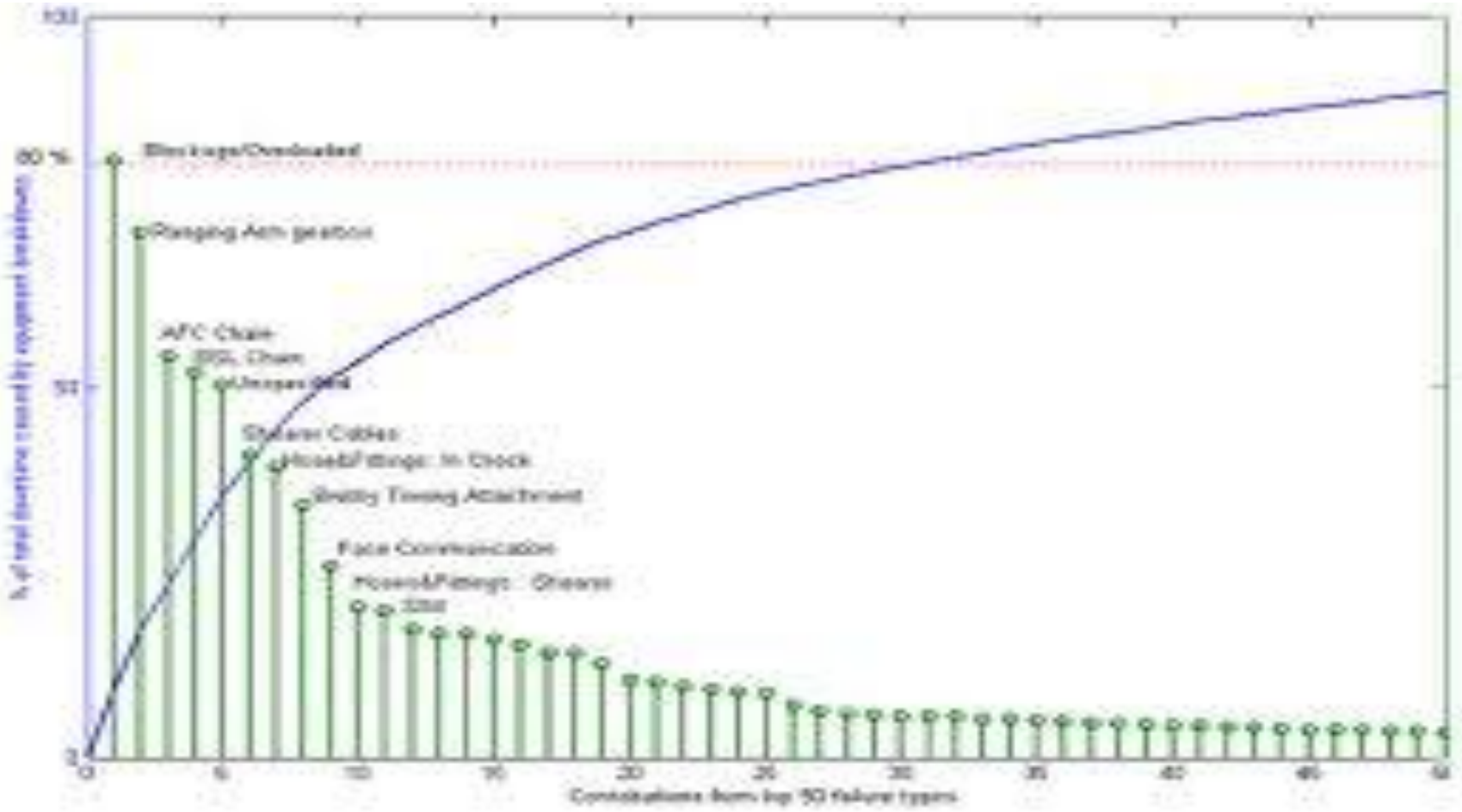
PART I: Application of Triple-T to CRIMES

- Granular Data Revolution—1980s
- Within neighbourhoods
- Micro-places
- Micro-times
- Recurrent Situations (“Problems”)
- Incentive structure (Cash, portable value)
- Scarce resources
- Return on investment

I.a. Targeting:
Hot Spots of Violent Crime, Tokyo

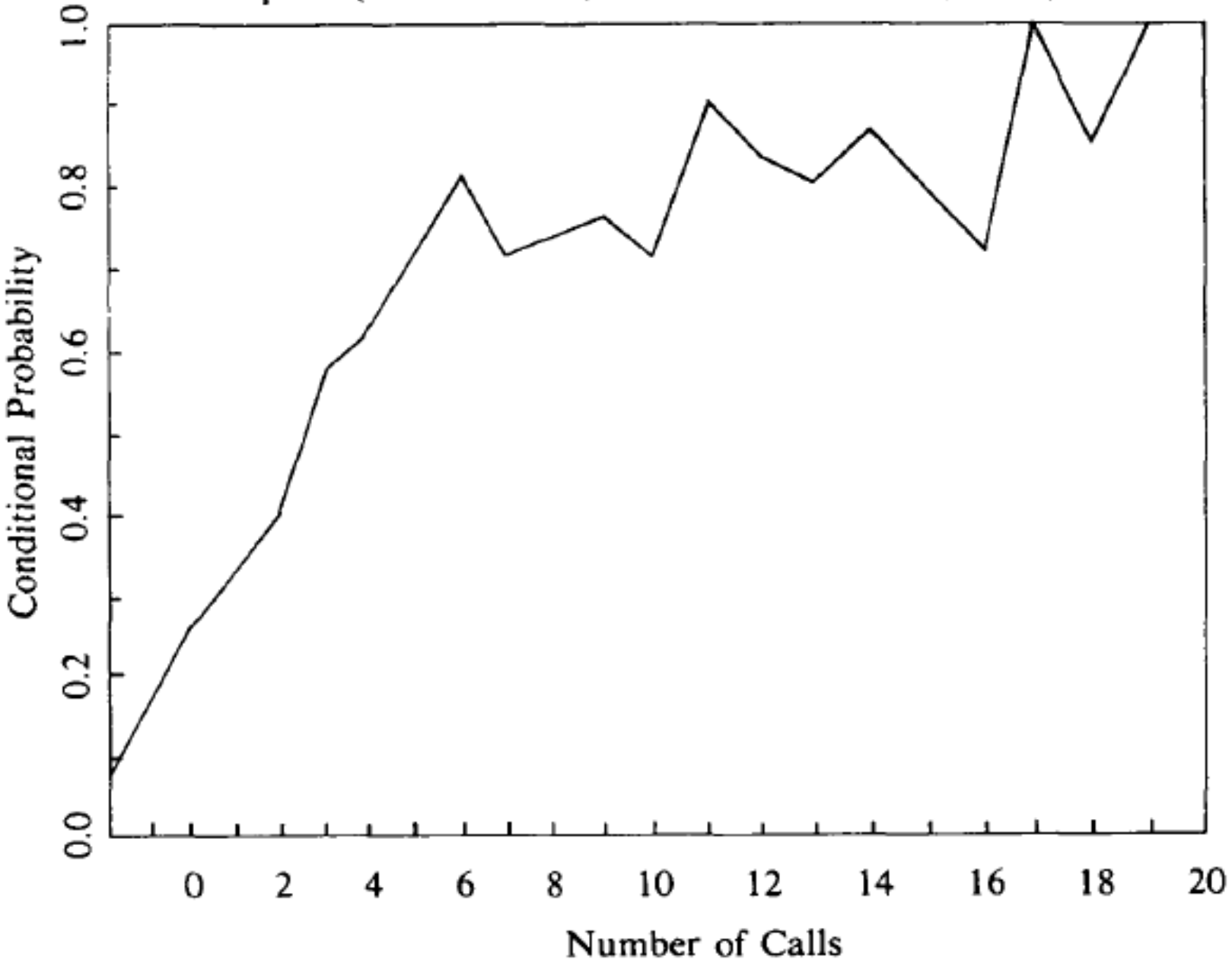


Pareto Curves: a “Power Few”



“Hot Spots” of the American Society of Criminology, 2013

Figure 1 Conditional Probability of k + 1 Calls Given k Calls for Rape/ Criminal Sexual Conduct, Robbery, and Auto Theft in Minneapolis (December 15, 1985—December 15, 1986)



Long-Term Patterns, Seattle 14 yrs

D. Weisburd et al 2004

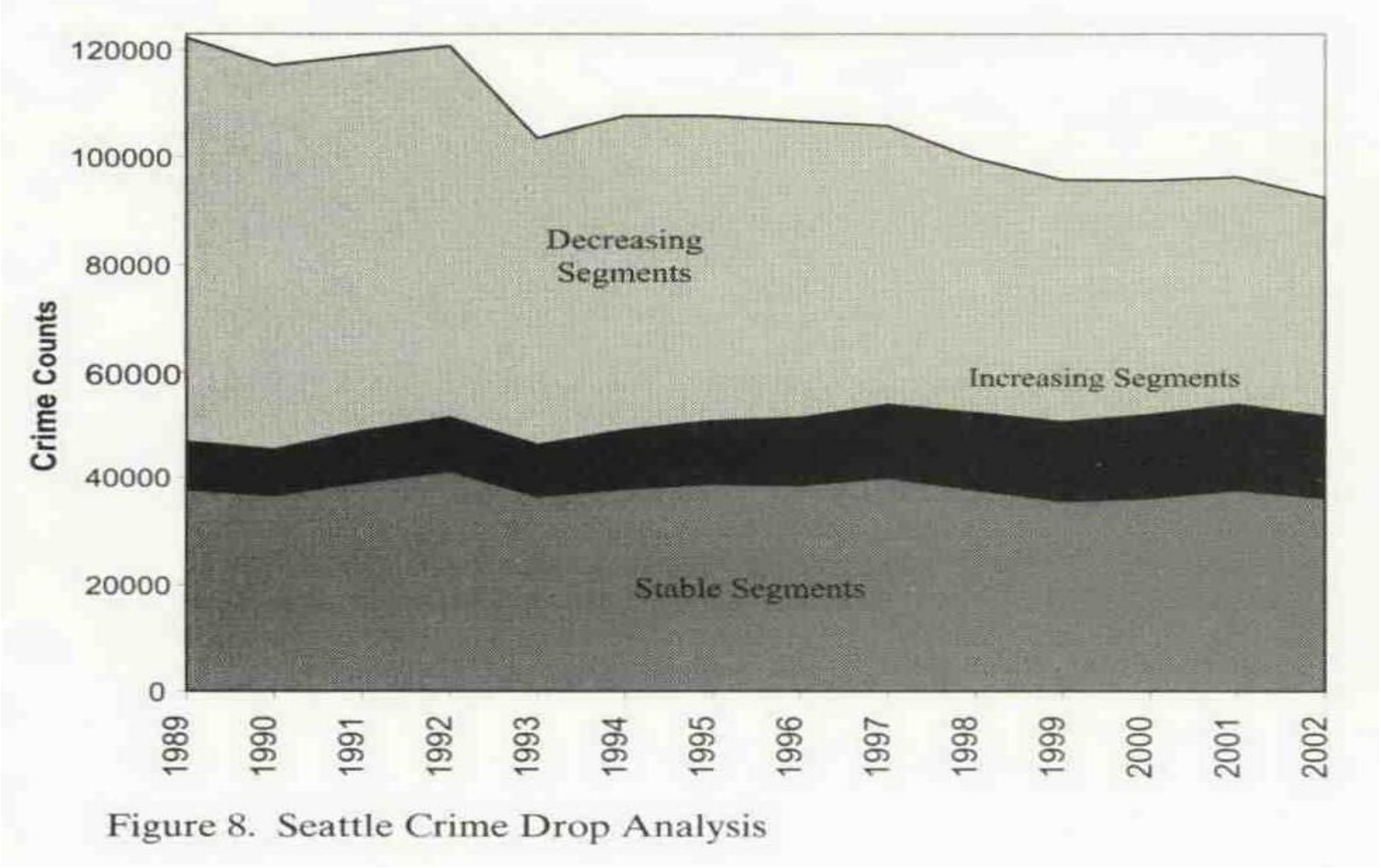
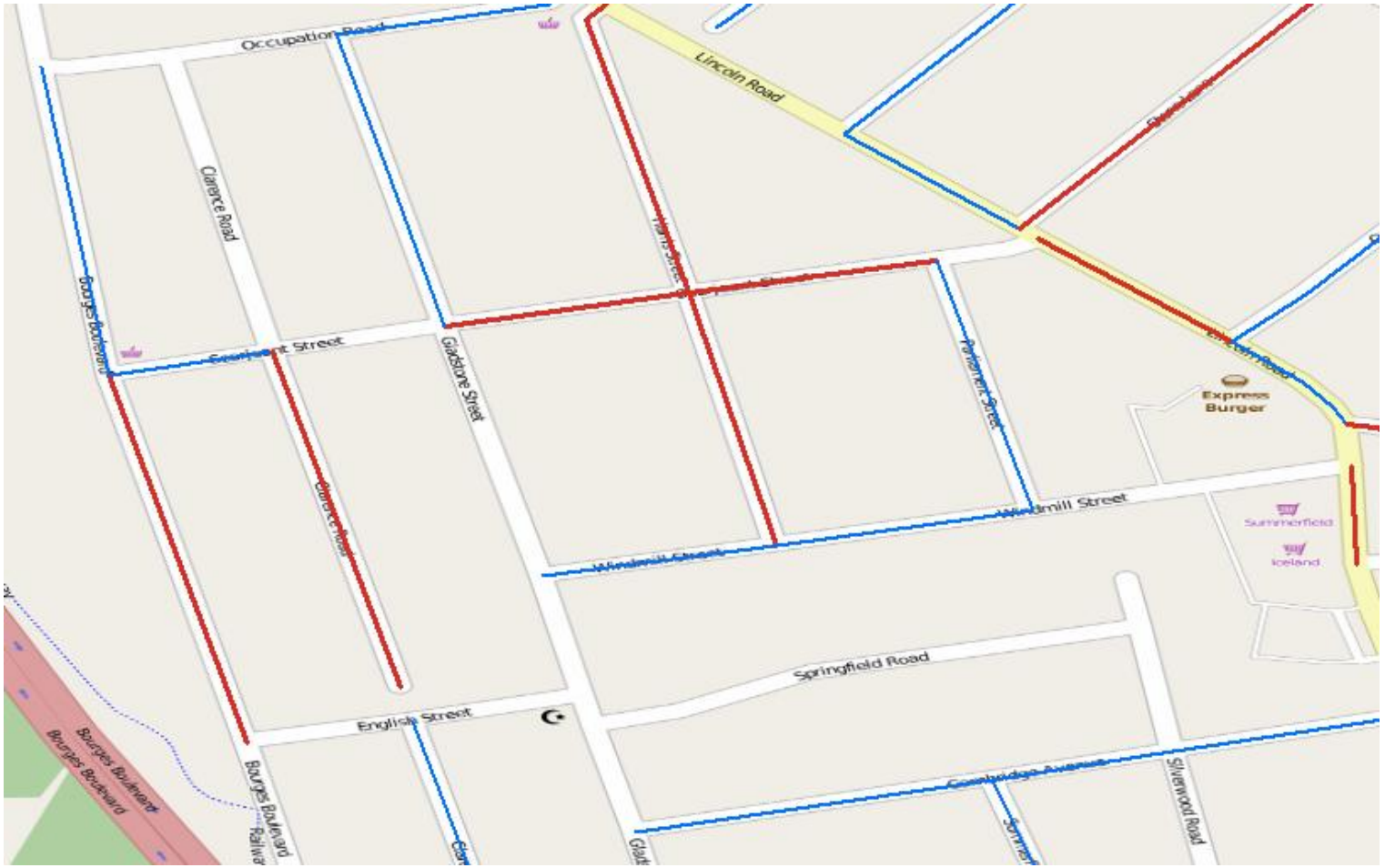


Figure 8. Seattle Crime Drop Analysis

Peterborough: C. Weinborn
Street Segments 60 Crimes Per Year



Long-Term Hot Spot Cohort Studies

Criminal careers of places:

--Persistence

--Desistance

--Taxonomies

--Trajectories

Peterborough

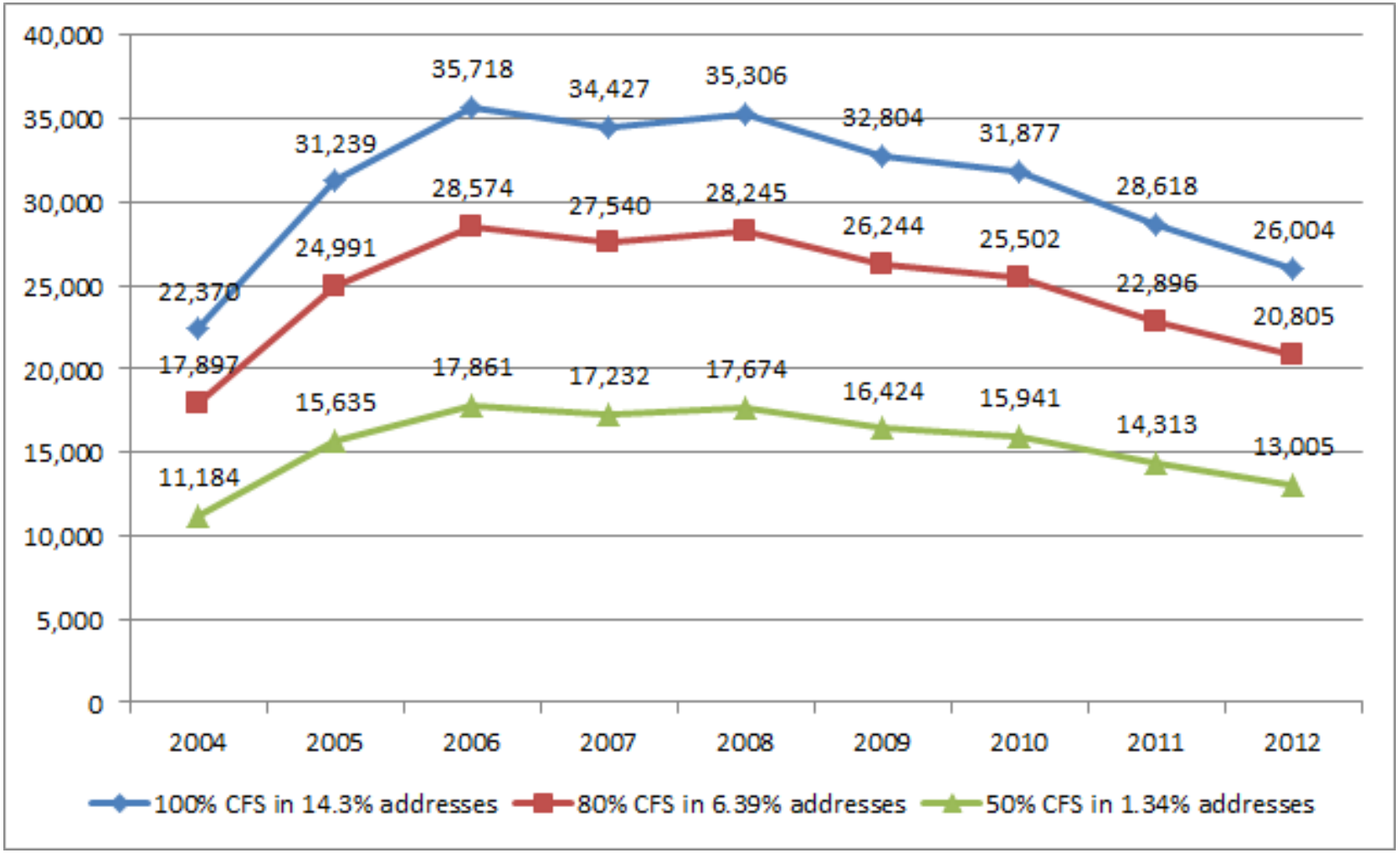
Birmingham

Cristobal Weinborn

CAMBRIDGE
Jerry Lee Centre of
Experimental Criminology

Unique addresses: 30+ per year

Peterborough: 50% of Calls to 1.3% of addresses—8 years



I.B. Testing

General Deterrence Hypothesis:

- Effects of concentrating patrols to match
- Concentrations of crimes in
- Space and Time?

"Hydraulic" Displacement Hypothesis:

Criminal motivations cause fixed N of crimes

Each crime deflected by police patrol will

Move to another place and time—no net effect of focused patrol

First Test of Hot Spots Patrol

- Minneapolis Hot Spots Experiment
  (L. Sherman & D. Weisburd 1995)
- 110 Hot Spots (Street corners)
- 55 got extra patrol—RCT
- 18 Observers counted patrol time, crime
- 50% fewer Calls for service
- 2/3 reduction in robbery
- 50% reduction in disorder

Figure 1. Ratio of Experimental to Control Minutes of Observed Police Presence, by Month

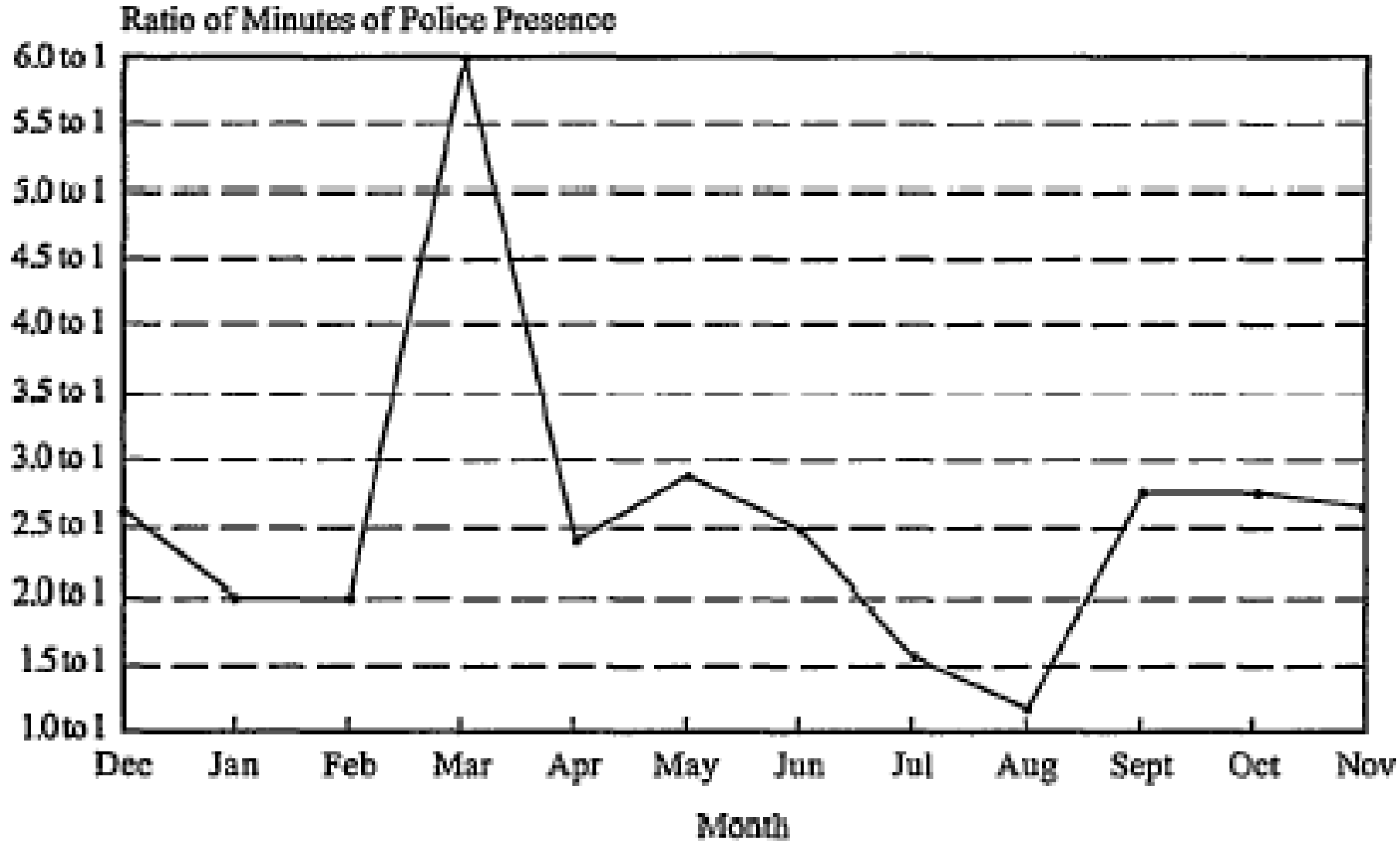
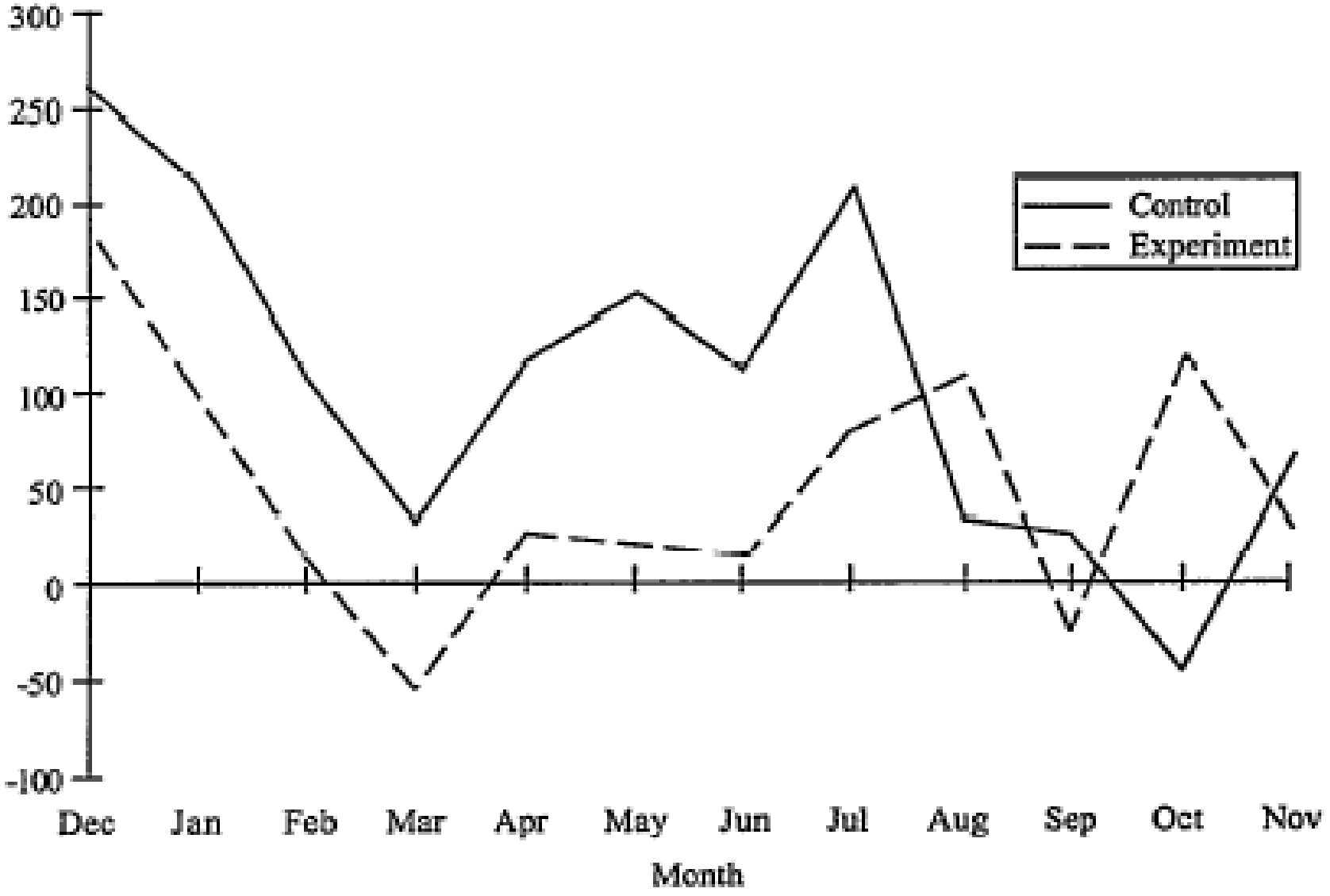
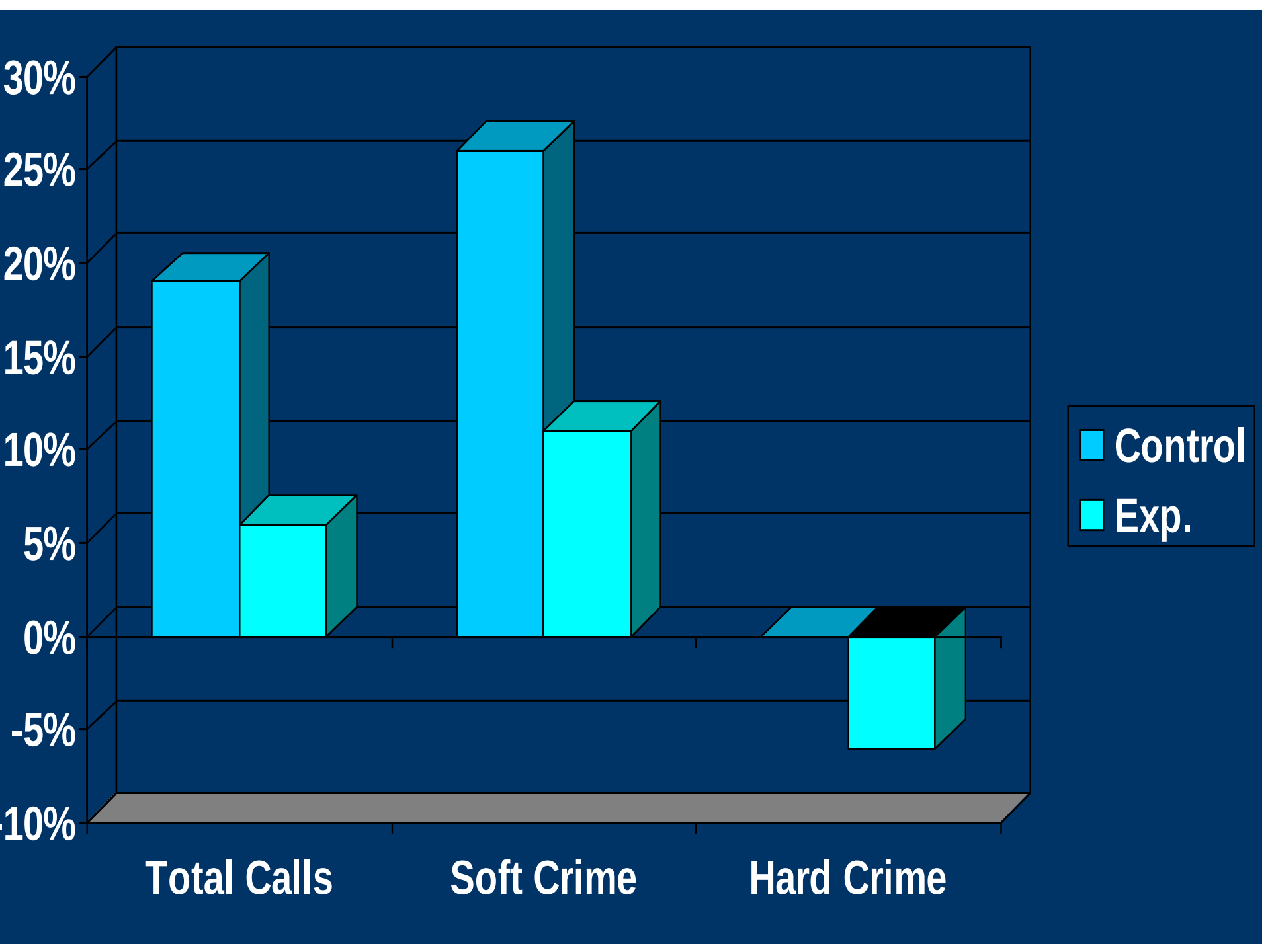


Figure 2. Absolute Differences From Baseline to Experimental Year in Total Crime Calls by Month and Treatment Group




30%
25%
20%
15%
10%
5%
0%
-5%
-10%
Total Calls
Soft Crime
Hard Crime
Control
Exp.

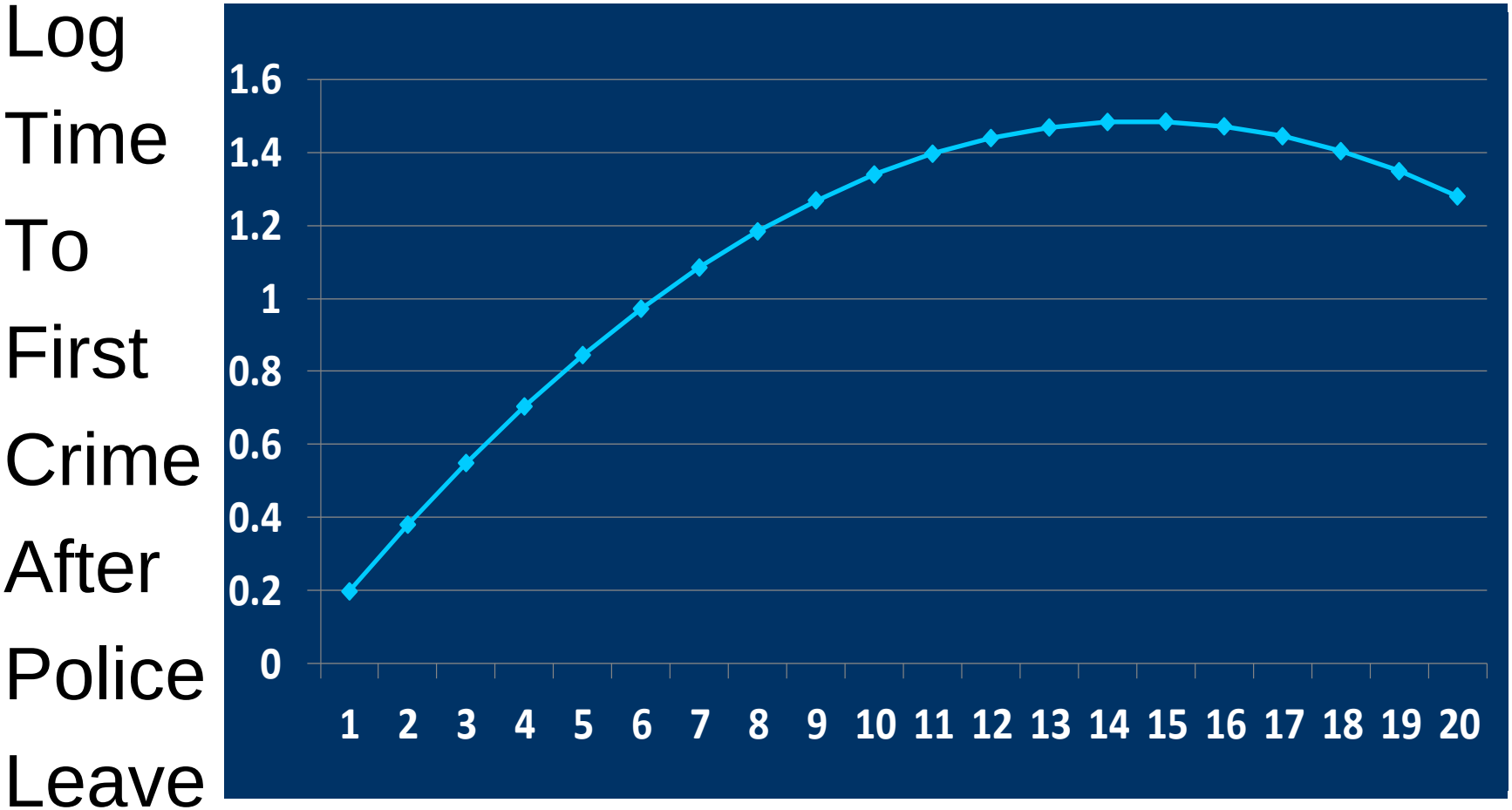
Optimal Patrol Time Per Location: 10-15 Minutes

- Minutes police Present → Minutes to first crime after Police leave the Hot Spot = "Residual Deterrence" (L. Sherman 1990)

Testing:

Residual Deterrent Effects of Police Patrol on Crime in Hot Spots Maximized by 15 minute periods of patrol presence: The “Koper Curve”

(C. Koper, 1995)



New Dosage Measurement Technology

- GPS locator
- 13 second “ping”
- Can measure time
- In “Geo-fences”
- Track what public sees
- Replaces research students with stopwatches!

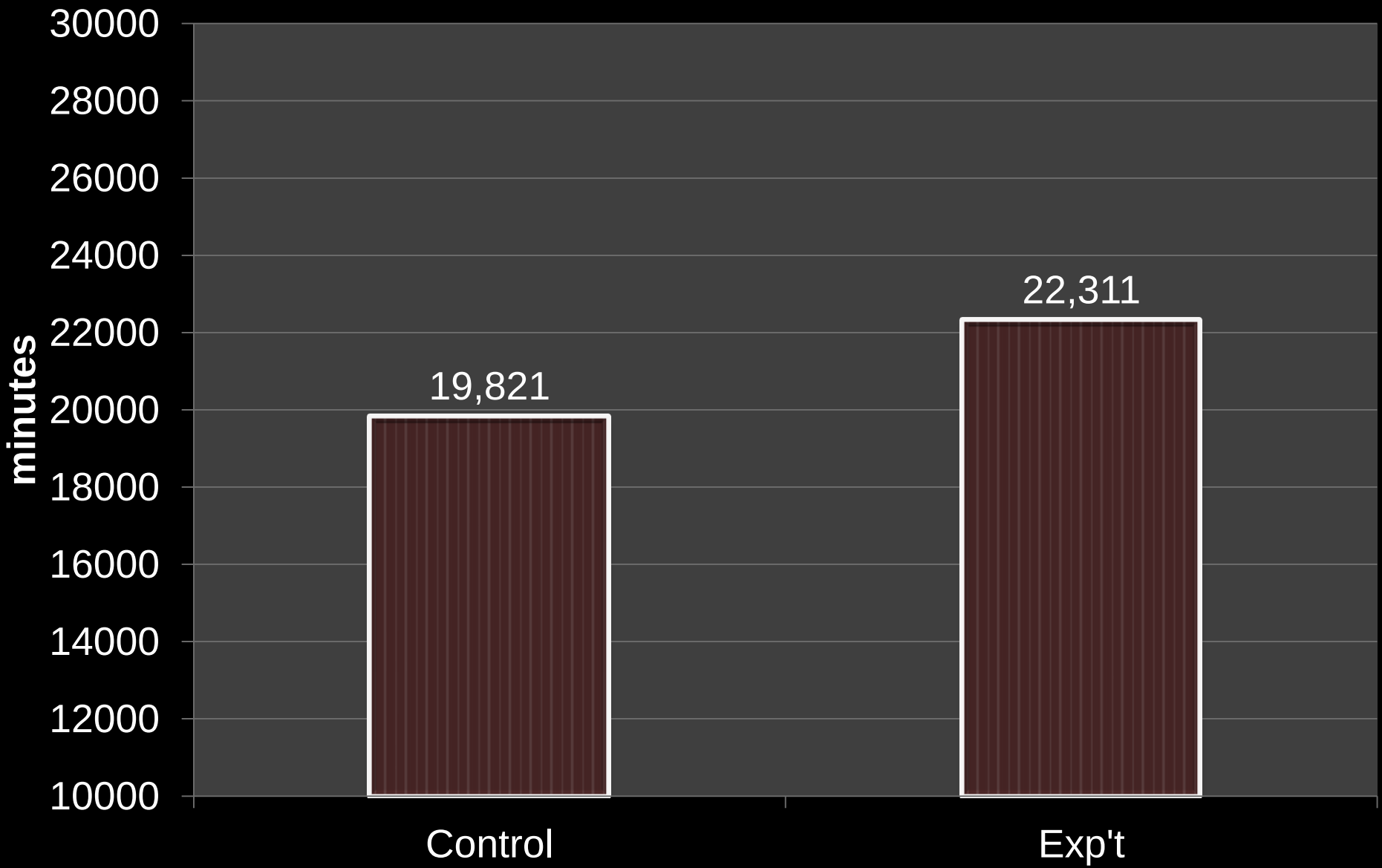
Pioneering GPS-Based Hot Spots Experiments

Dr. Barak Ariel

- Lecturer in Evidence-Based Policing
- Former Police Inspector in Israel
- Prize-winner

CAMBRIDGE
Jerry Lee Centre of
Experimental Criminology

Birmingham: Total Number of Minutes Officers Spent in 41 Treatment Hotspots and 41 Control Hotspots (15 days)



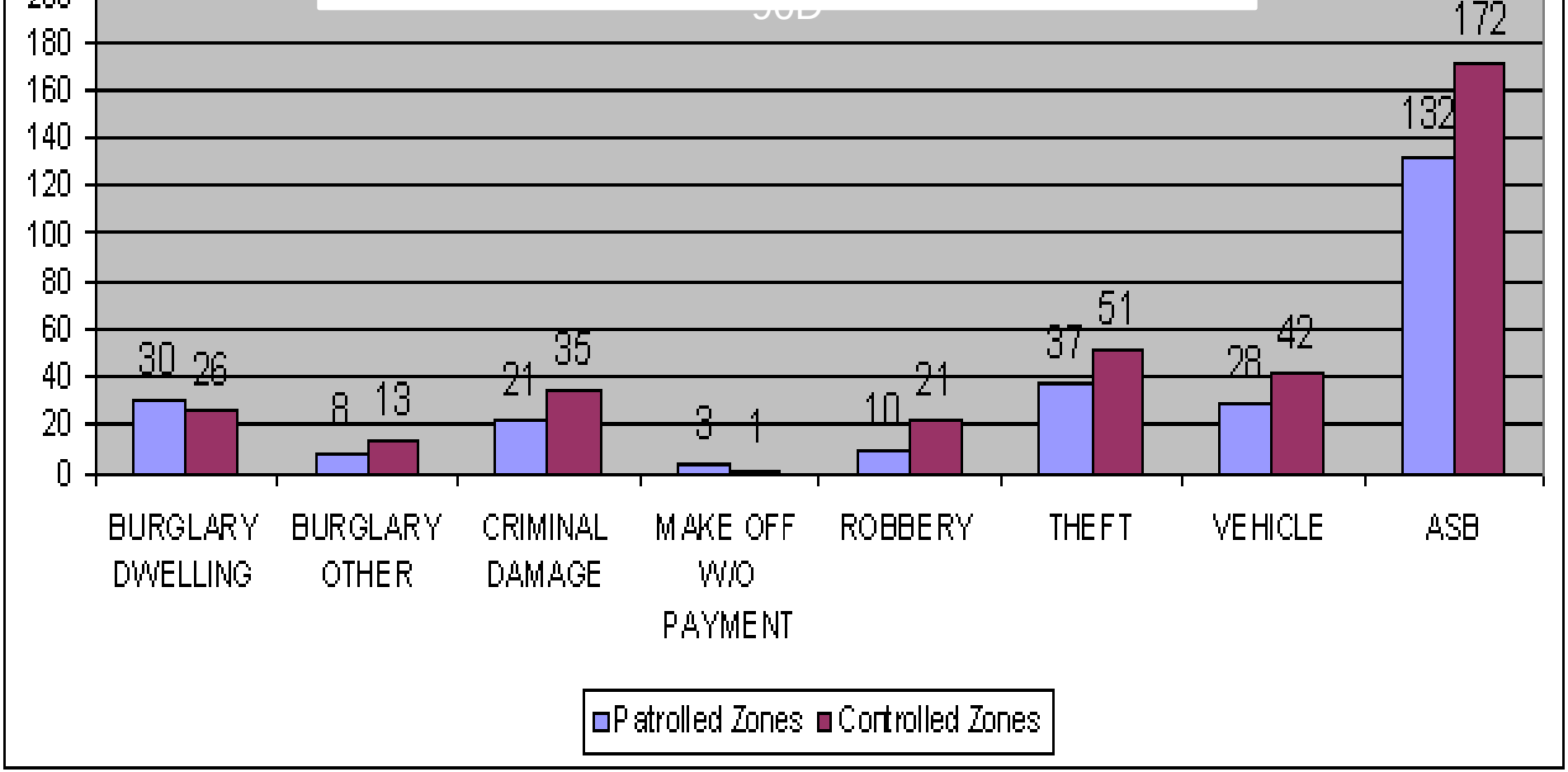
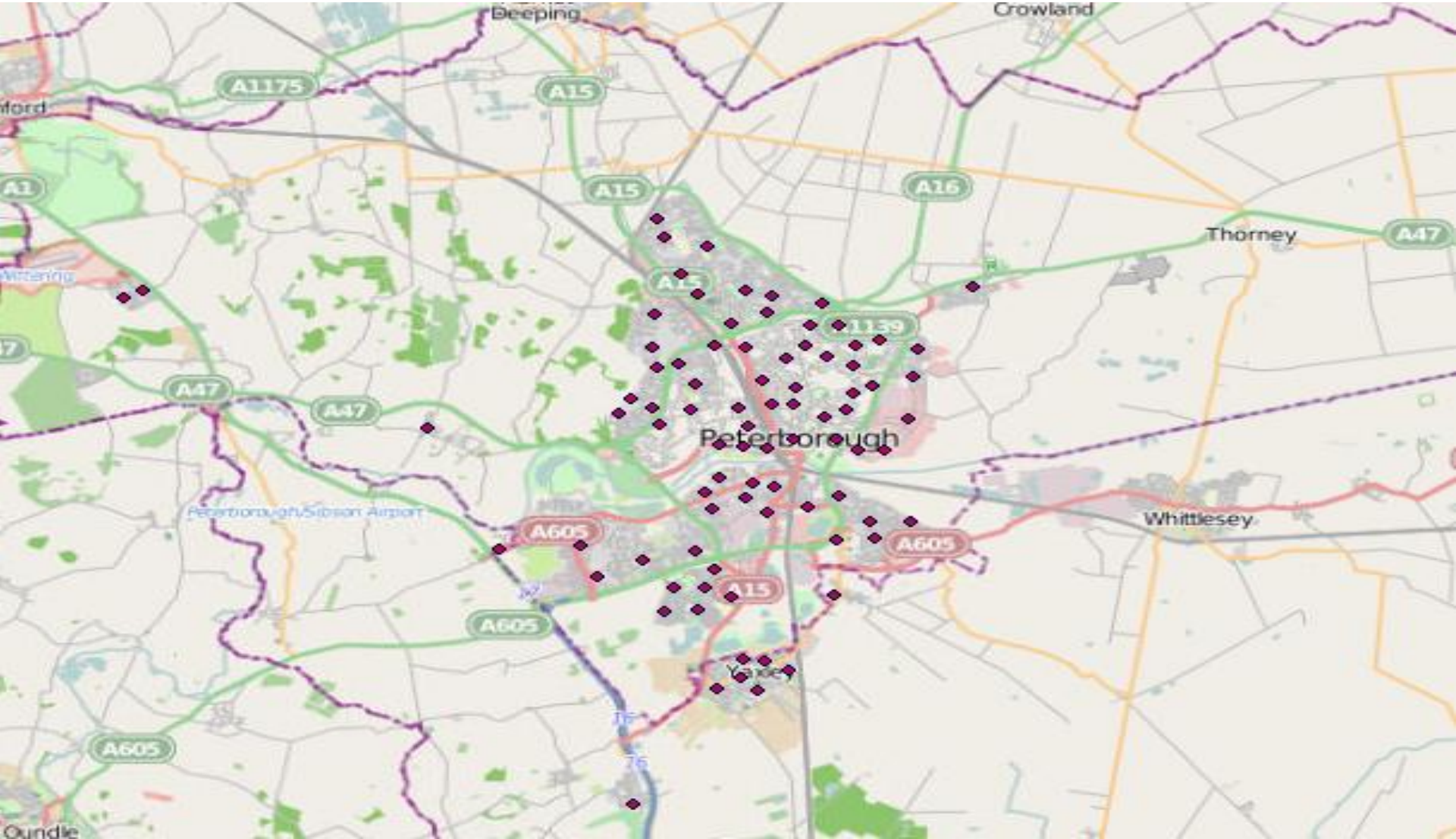


Chart shows rec

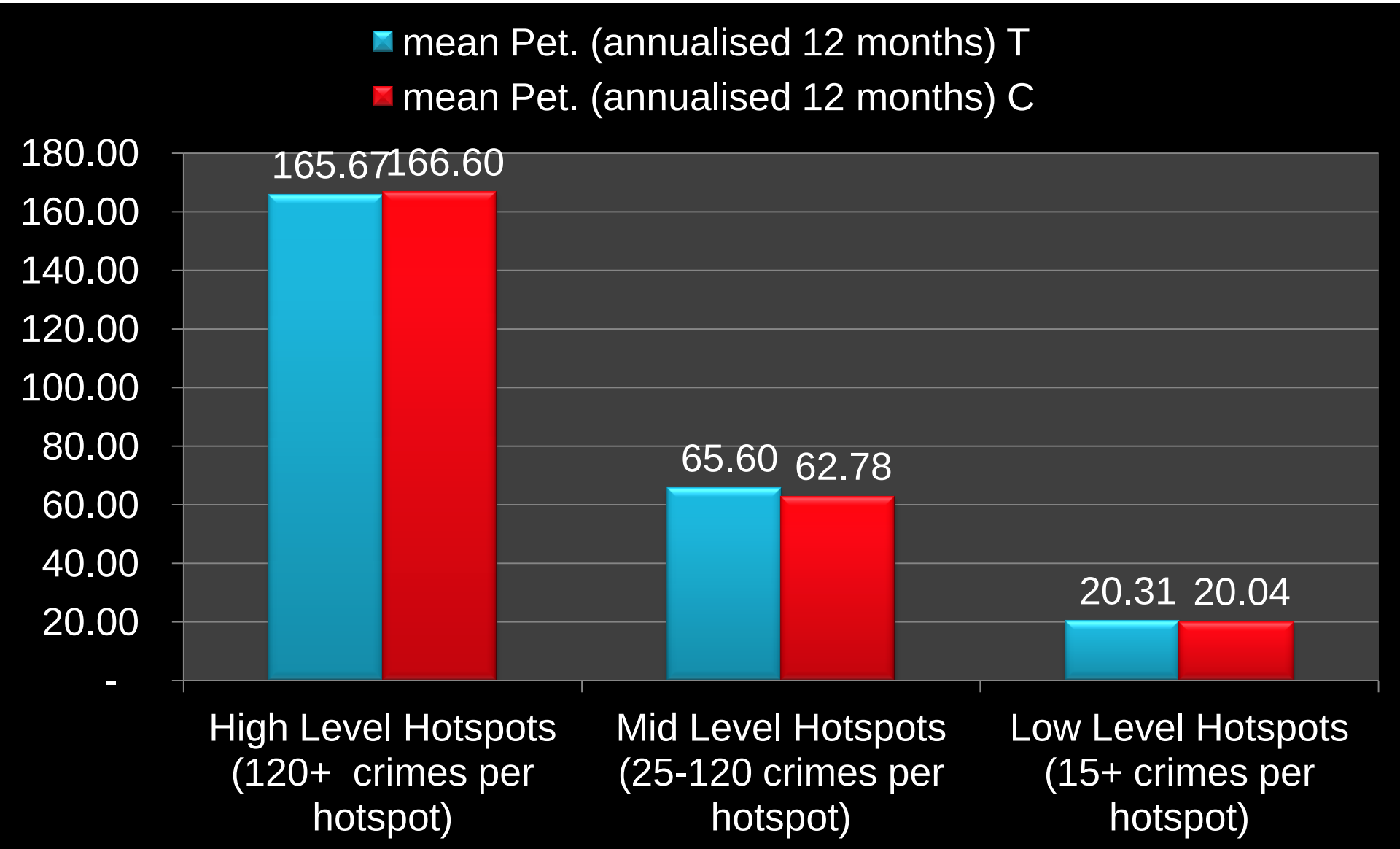
	Patrolled	Controlled	Difference in Patrolled
Total Incidents	269	361	-92

B. Ariel, A. Hebb, D. Vajzovic :
72 Hot Spots in Peterboro (Preliminary findings)

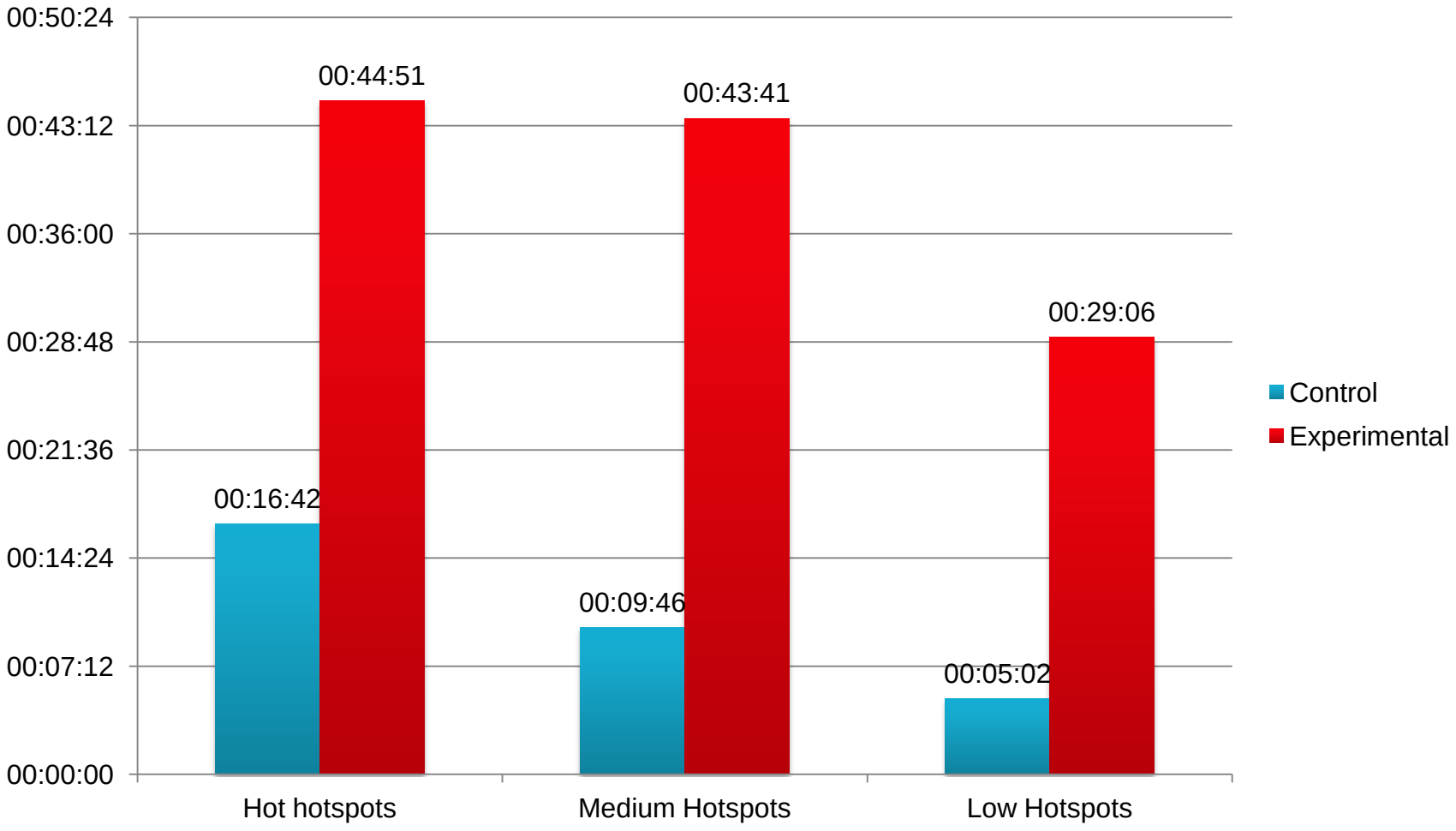



Cont.
150 meter radius
Per hotspot
More than 250 meters between
hotspots
Parker Road
Church Road
Boxer Road
Hall Lane
Legg Road
Trent Road
Parker Road
St Mary's Avenue
A1

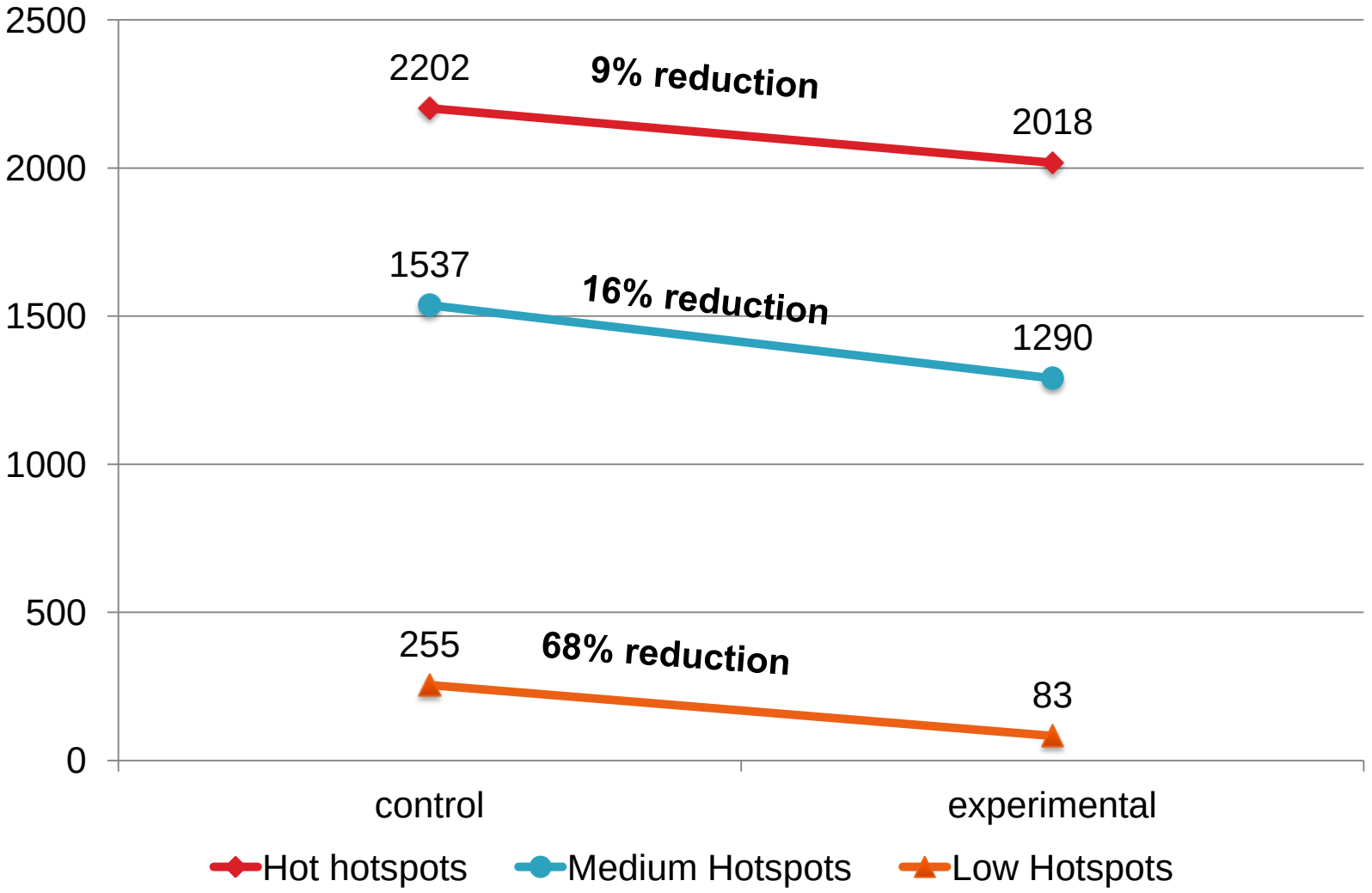
Crime Hotspots before RA



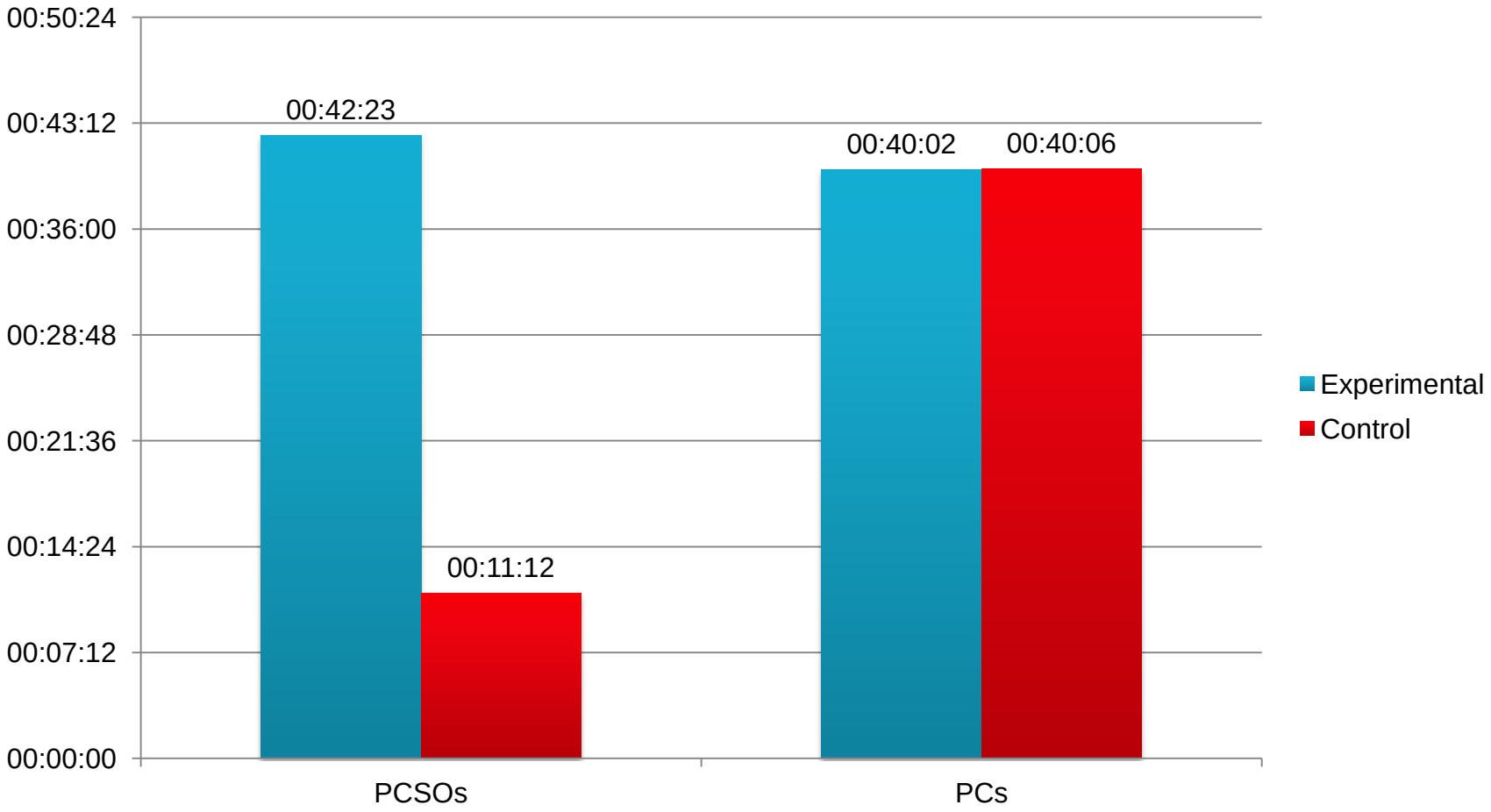
Mean time spent inside hotspots per day by PCSOs



Distribution of offences first five months by blocks



Mean time spent inside hotspots per day PCSOs vs. PCs

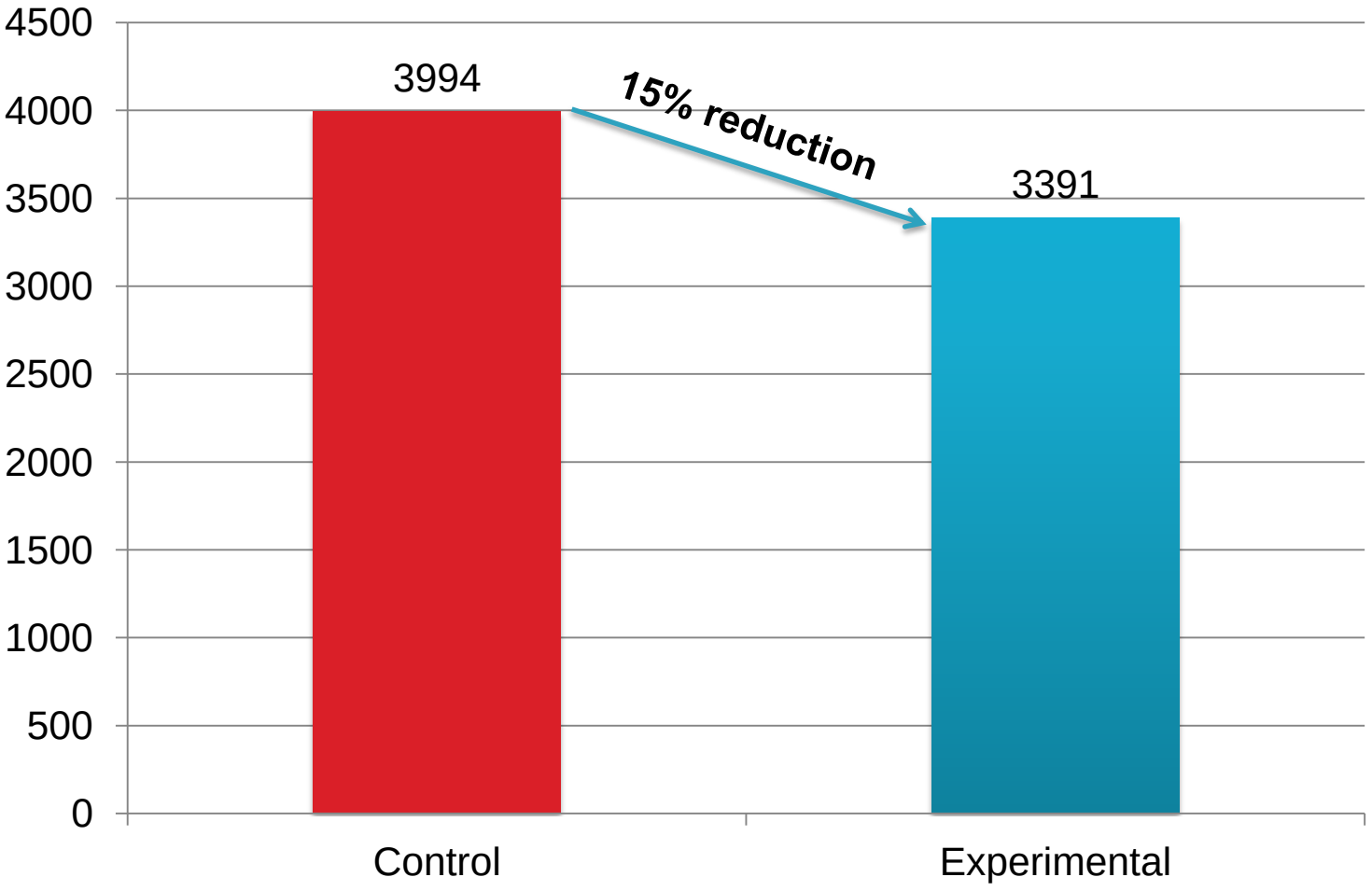


Similar Appearance

Constable

Police-Community SO

Reduction in offences between experimental & control areas



Over 20 Replications in all
(Braga et al 2012 Review)

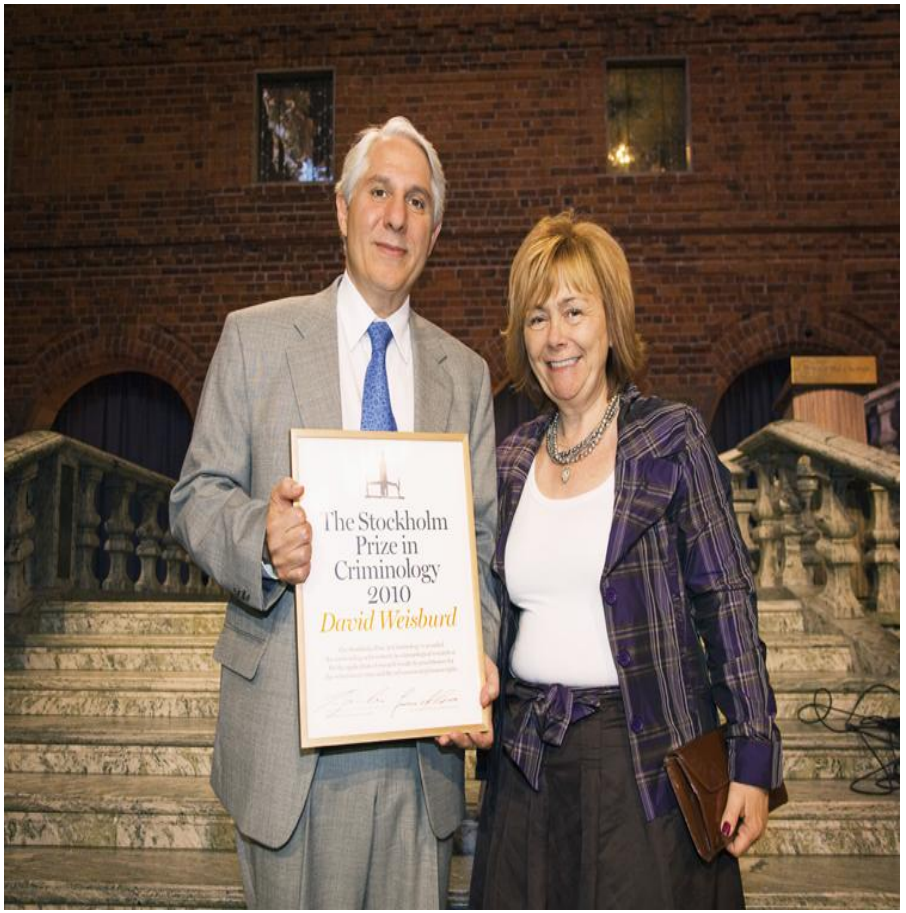
- Mostly find same effects
- No replication of Koper curve
  (Peterboro and Birmingham coming)
- No dosage-response curve
- Biggest gap—displacement analysis

1. Vicinity effects
2. Individual offender effects

Falsifying Vicinity Displacement

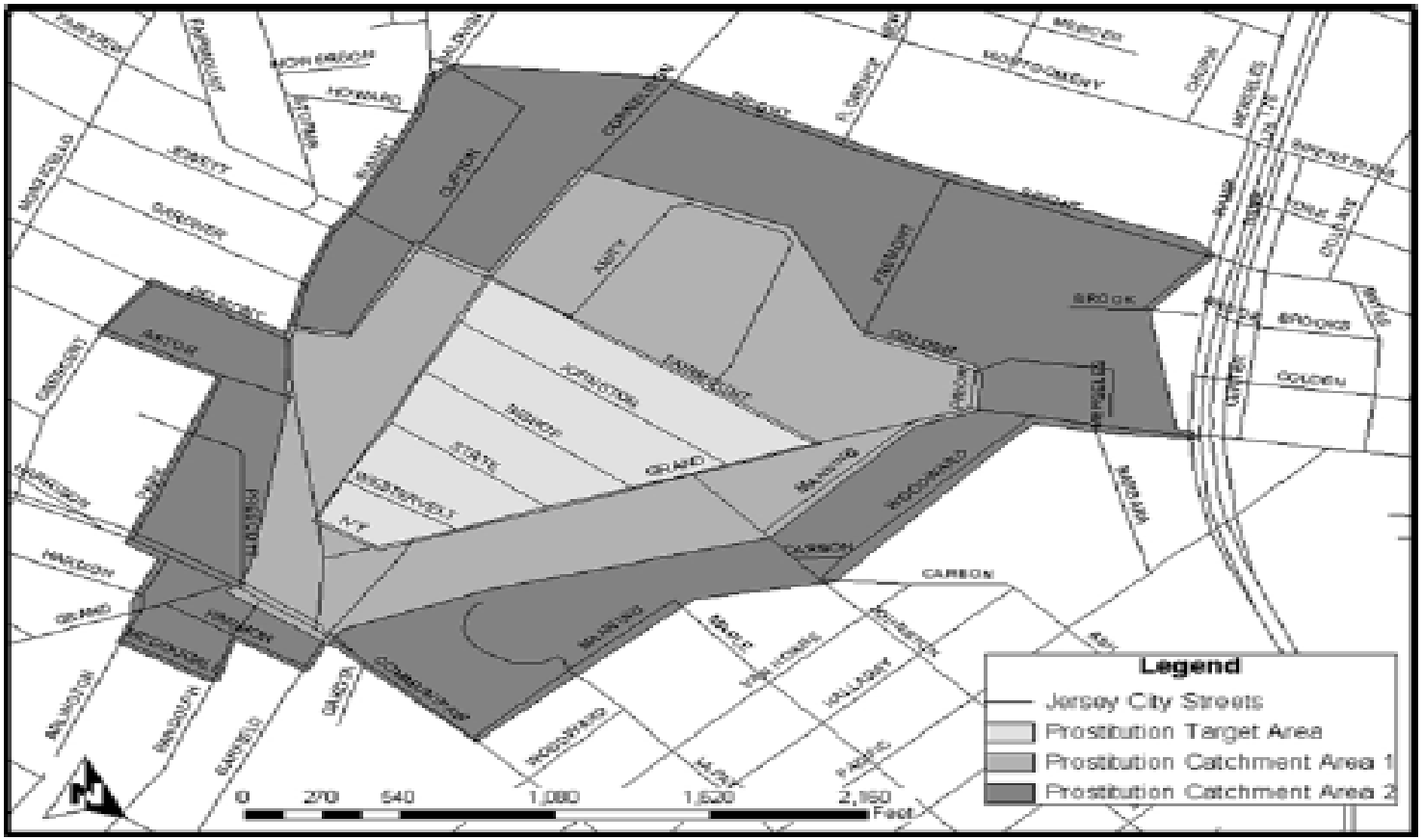
The Stockholm Prize in Criminology

David Weisburd

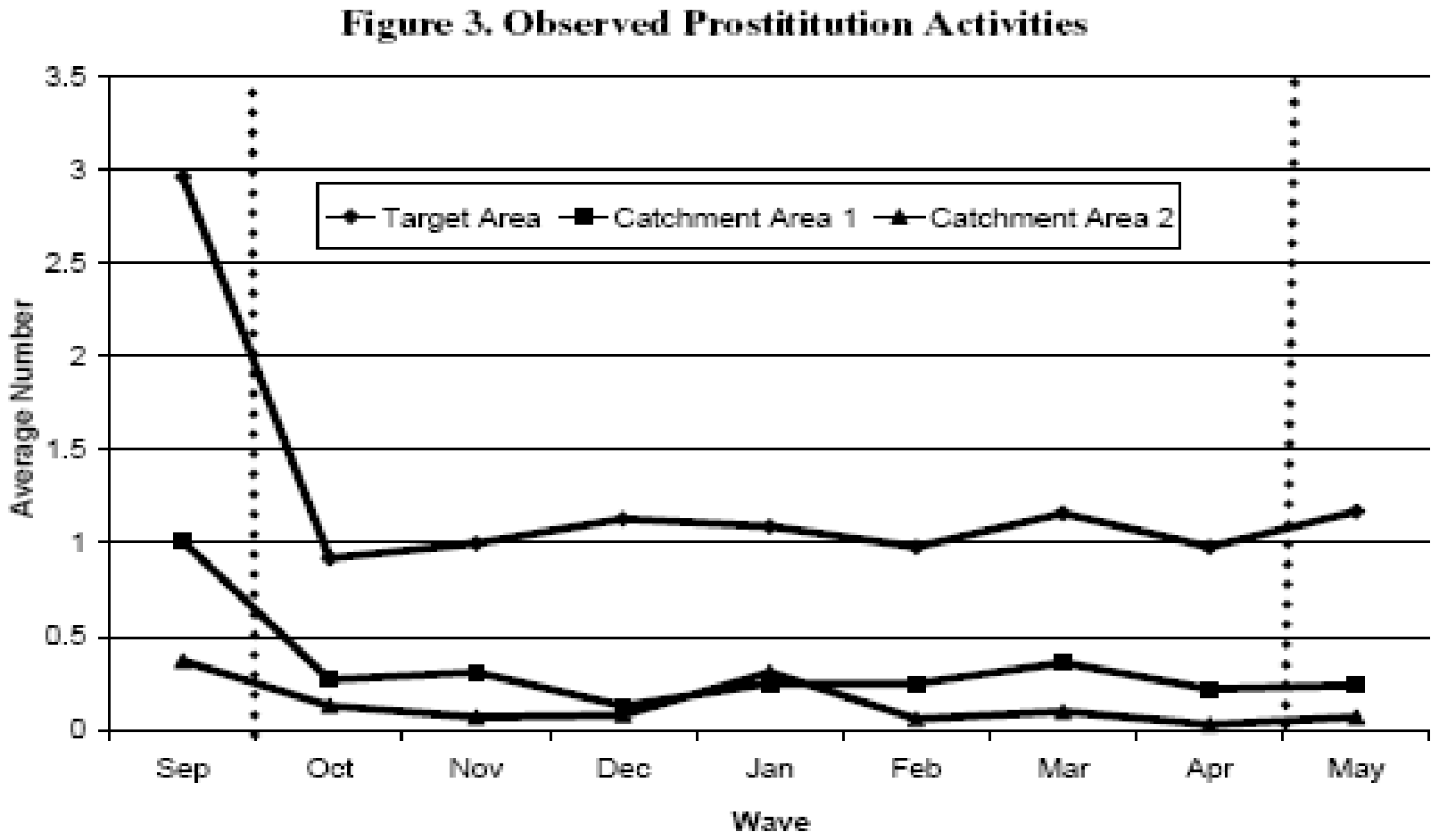


Vicinity Displacement? Weisburd, 2006: Jersey City

Figure 1. Map of the Prostitution Site Target and Catchment Areas

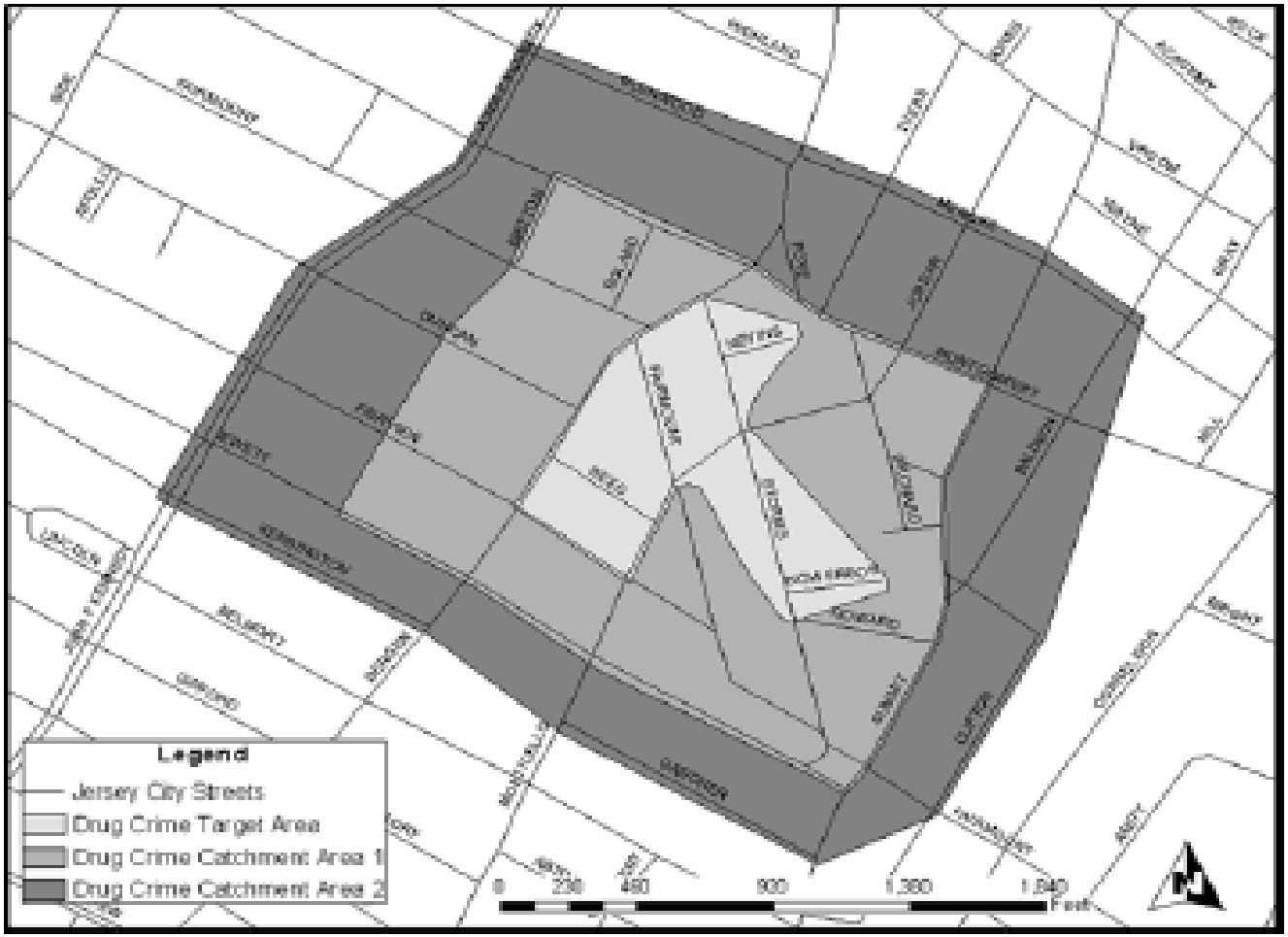


Not For Prostitution



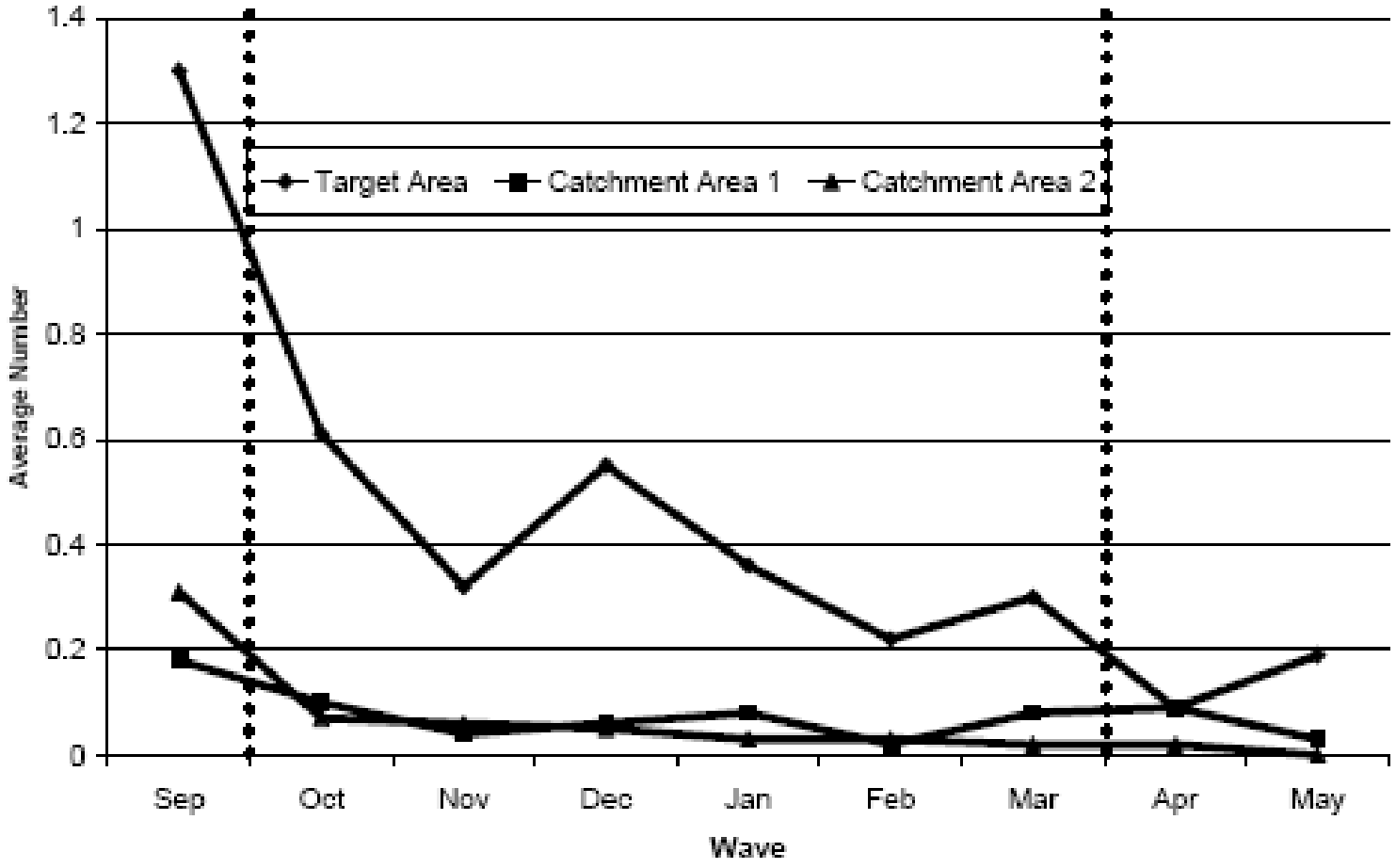
Open-Air Drug Dealing

Figure 2. Map of the Drug Crime Site Target and Catchment Areas



No Displacement of Drug Dealing

Figure 4. Observed Drug Activities



What about Offender Displacement?

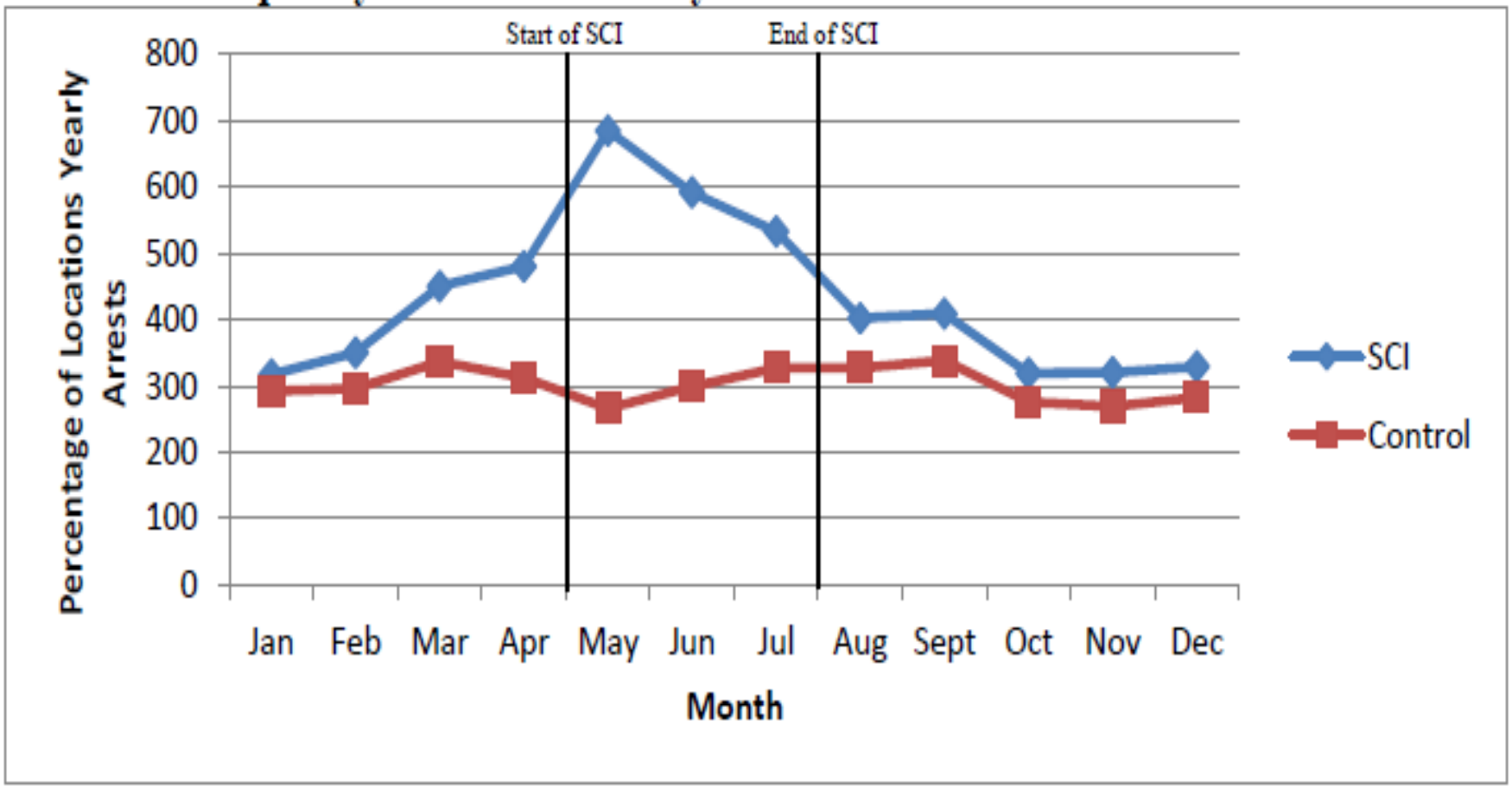
- Washington DC
- 2011
- Hot Spot Campaign
- Increased arrests
- Large robbery decline
- Matched control areas
- Quasi-experimental design

University of Maryland

David Mazeika

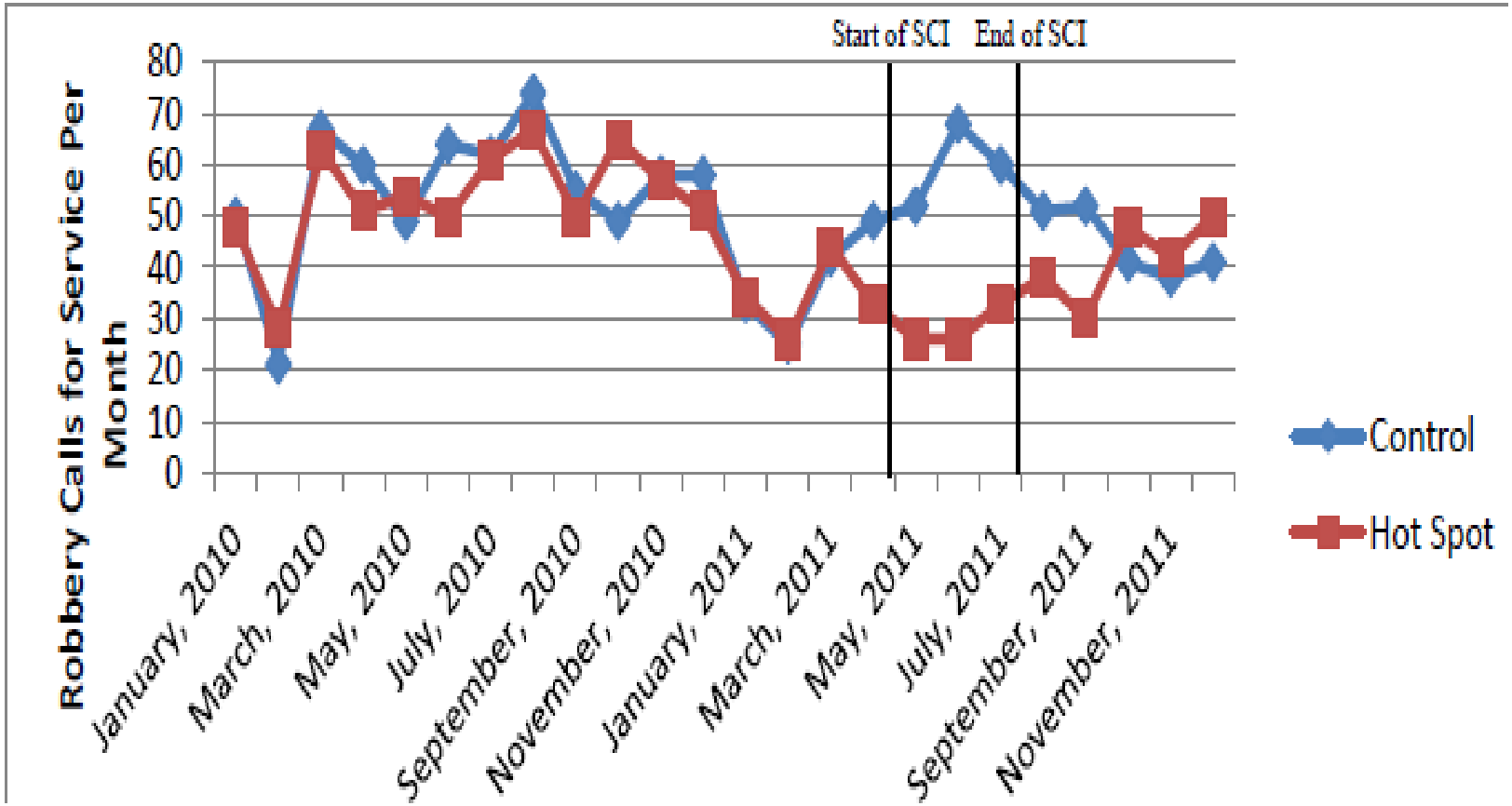
Arrests Went Up

Table 17: Frequency of 2011 Arrests by SCI Treatment Versus Control



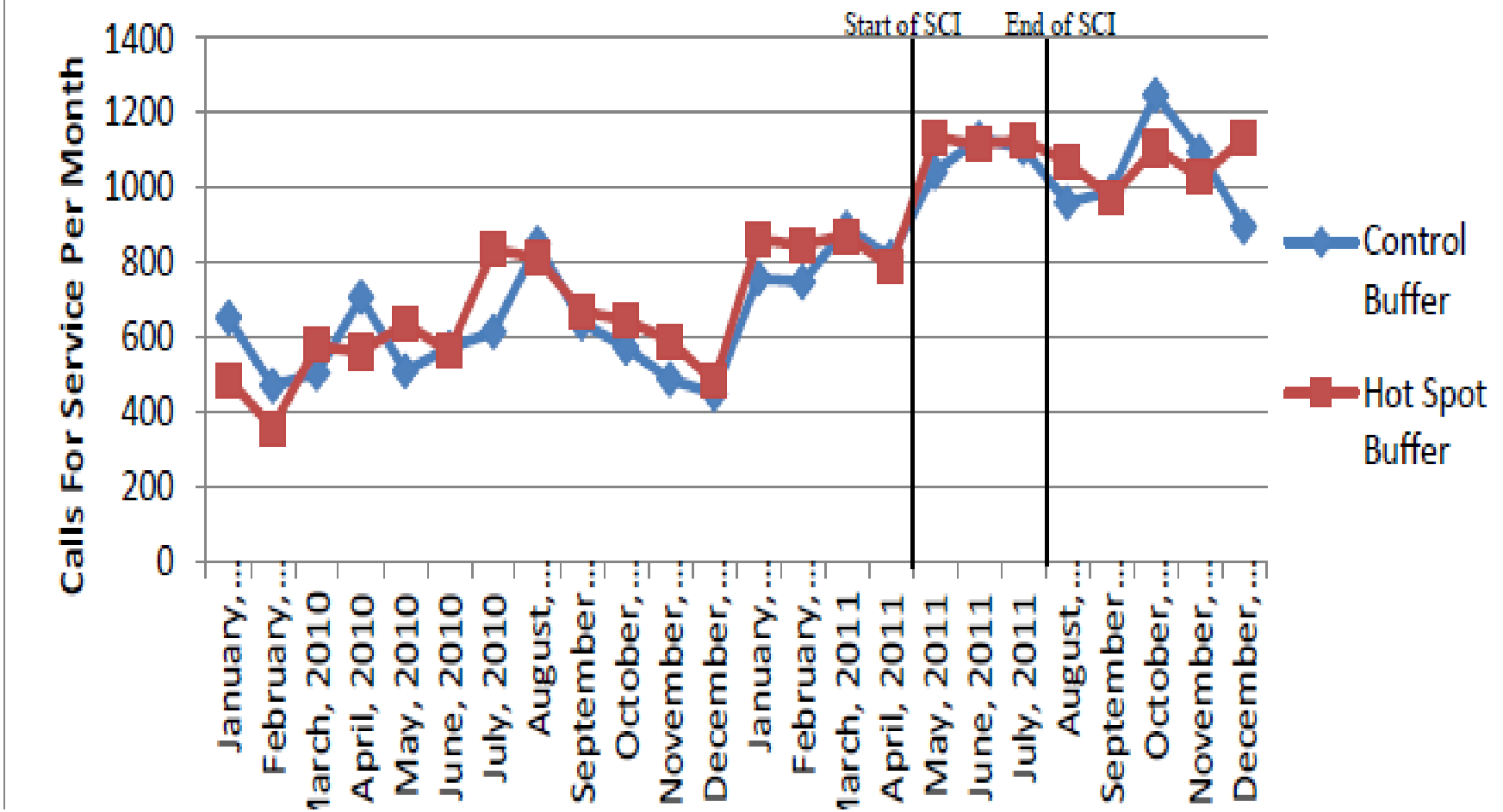
Robberies Went Down (colours reversed)

Figure 6: Total Number of Citizen-Generated Robbery Calls for Service



No Vicinity Displacement

Figure 7: Total Number of Citizen-Generated Calls for Service in Buffer Zones



No Offender Displacement (Arrested N = 231 vs. 244)

Period	Controls	Target	P
16 Months Before	244 (100%)	231 (100%)	
3 Months During	10 (4.1%)	4 (1.73%)	0.1276
New Location	7 (2.87%)	4 (1.73%)	0.4094
5 Months After	12 (4.92%)	14 (6.06%)	0.5854
New Location	10 (4.1%)	4 (1.73%)	0.1276
8 Months During and After	22 (9.02%)	18 (7.79%)	0.6297
New Location	17 (6.97%)	8 (3.46%)	0.0875

1.c. Tracking: The Next Frontier

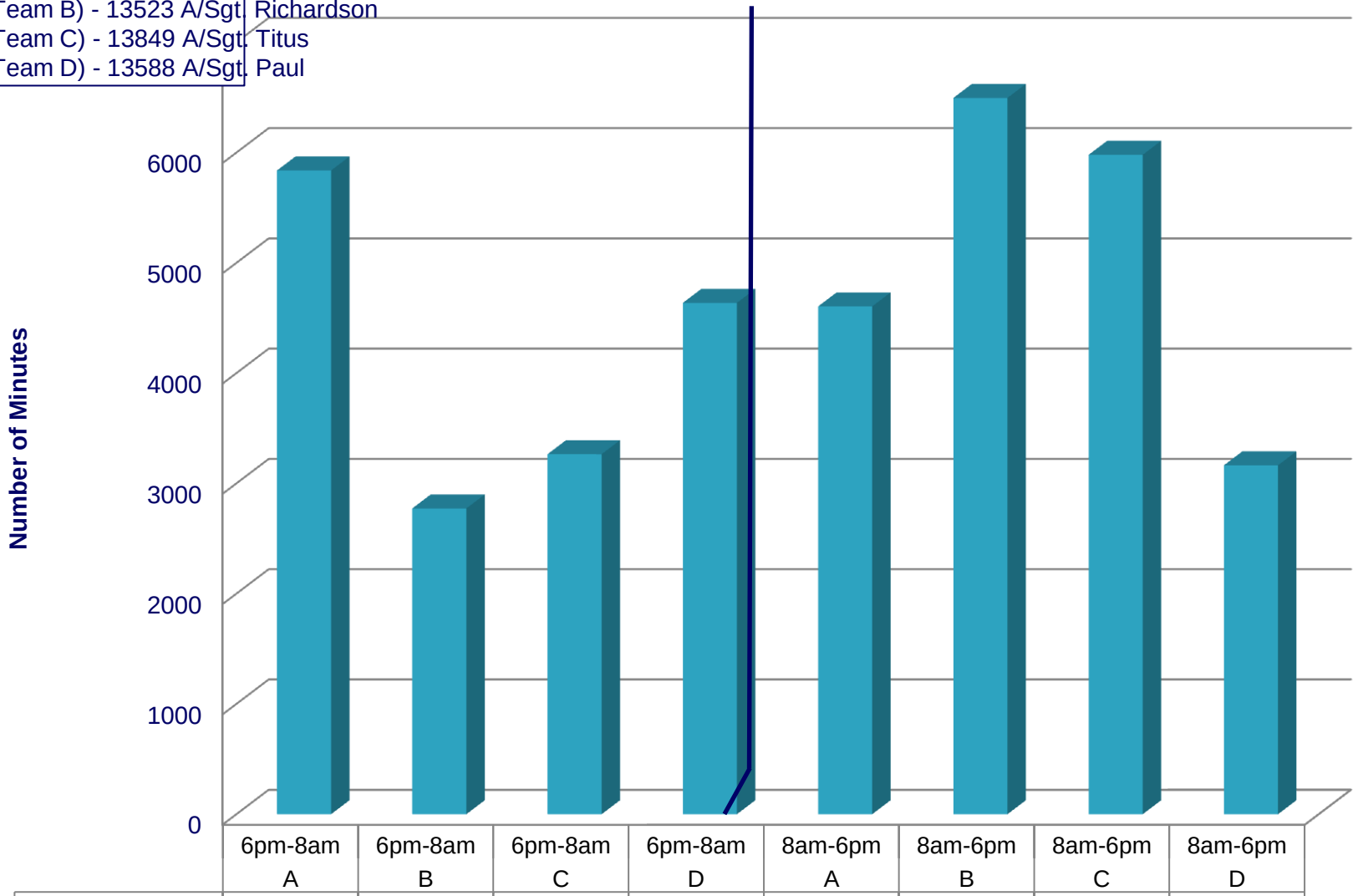
- GPS Providers Failed to Design Reports
- Camera providers may now do so
- Most expensive investment in prevention
- Subject to least accounting
- Many studies show half of time in stations
- Focus on hot spots doubles challenge
- More time out
- Team-by team competition

Trinidad Police

Team Commanders
Team A) - 12487 A/Sgt. Ali
Team B) - 13523 A/Sgt. Richardson
Team C) - 13849 A/Sgt. Titus
Team D) - 13588 A/Sgt. Paul

Total Patrol Time by Week in Minutes

Report Period- 12/1/14 to 25/1/14

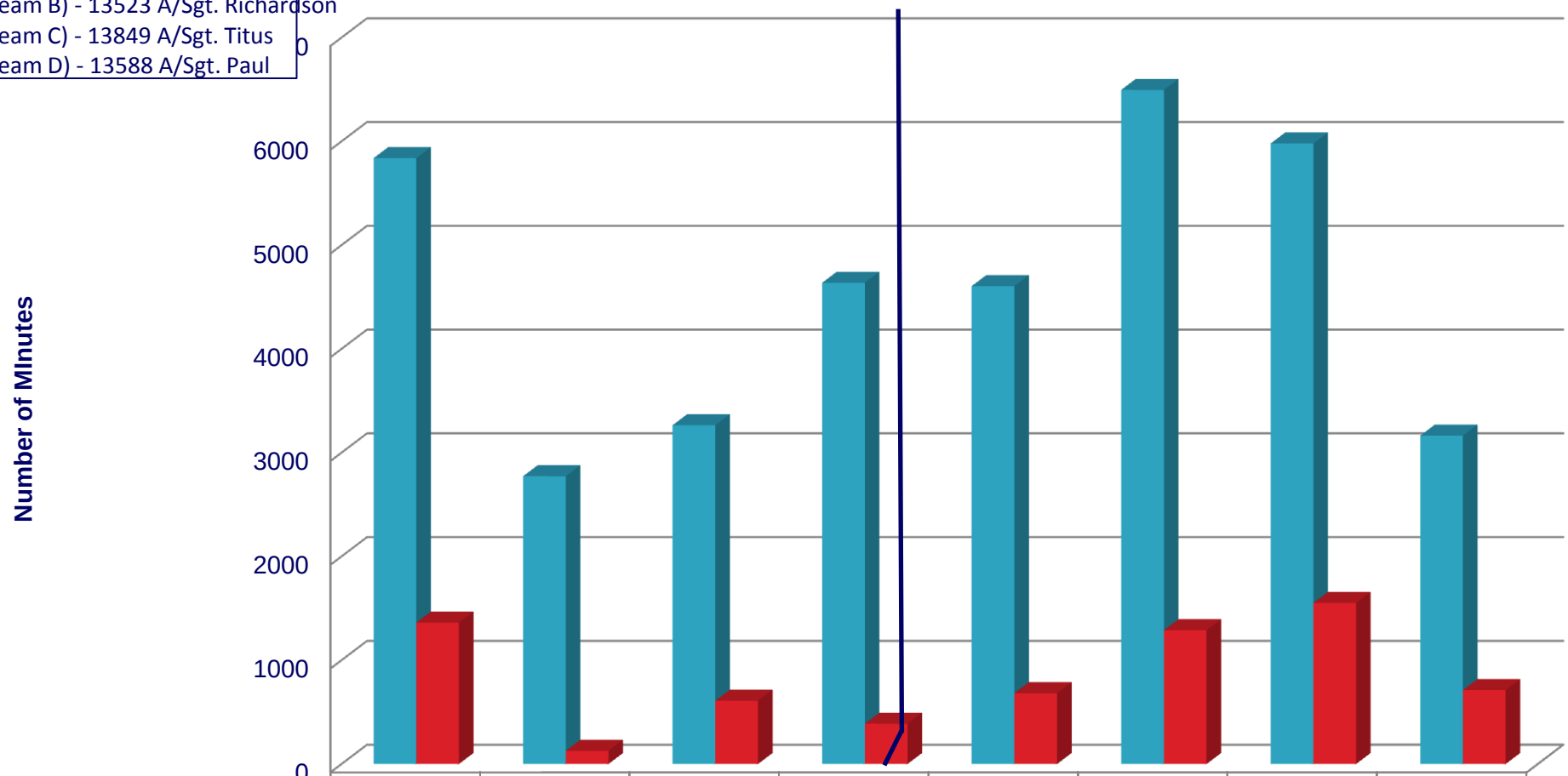


Missing the Target

Team Commanders
Team A) - 12487 A/Sgt. Ali
Team B) - 13523 A/Sgt. Richardson
Team C) - 13849 A/Sgt. Titus
Team D) - 13588 A/Sgt. Paul

Ratio of Patrols in and out HotSpots in Minutes

Report Period- 12/1/14 to 25/1/14



	6pm-8am A	6pm-8am B	6pm-8am C	6pm-8am D	8am-6pm A	8am-6pm B	8am-6pm C	8am-6pm D
Total Patrol Time	5838	2773	3265	4637	4605	6496	5980	3164
Total Patrol Geo-fence HS	1362	127	609	388	683	1289	1552	712

Will Managers Apply Research?

- Will discussion & competition lead to more patrols where they are needed most?
- Patrol maps, orders alone, may not work
- UK police best in the world
- Most crime is elsewhere
- Trinidad had 45 murders last month
- Need for hot spots patrols is critical
- Catching crooks vs. prevention?

PART II:
Applying Triple-T to CRIMINALS

- Police catch millions by arrest
- What then?
- Half of all cases disposed by police
- Even more arrests are “NFA”
- How to apply Tripe-T?
- Using English law since 1300s
- Prosecution only in the “public interest”

Triple-T for Offenders

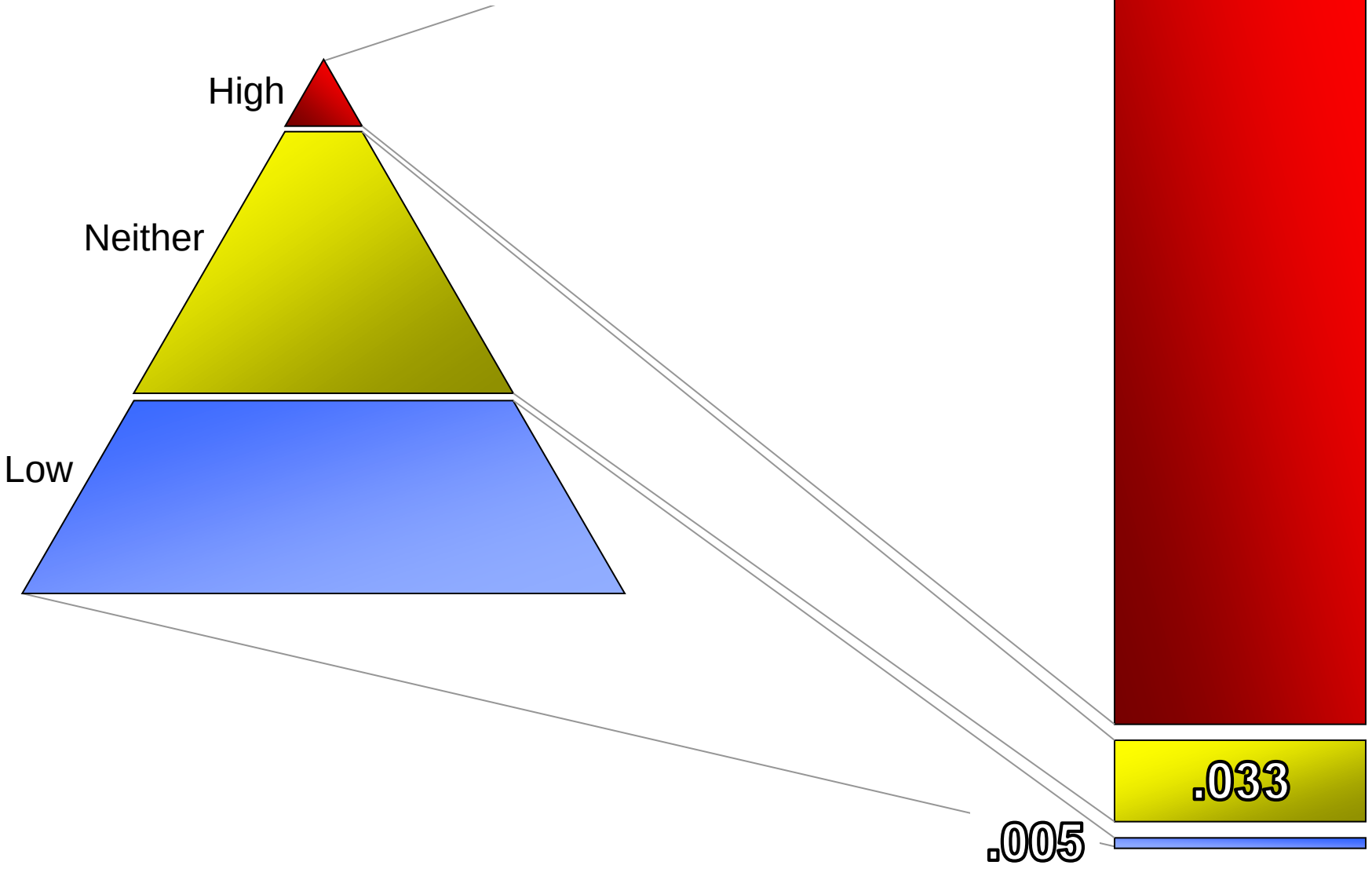
- Targeting by harm severity
- Testing by desistance outcomes
- Tracking offender management by plan

II.a.Targeting Criminals by Harm Level

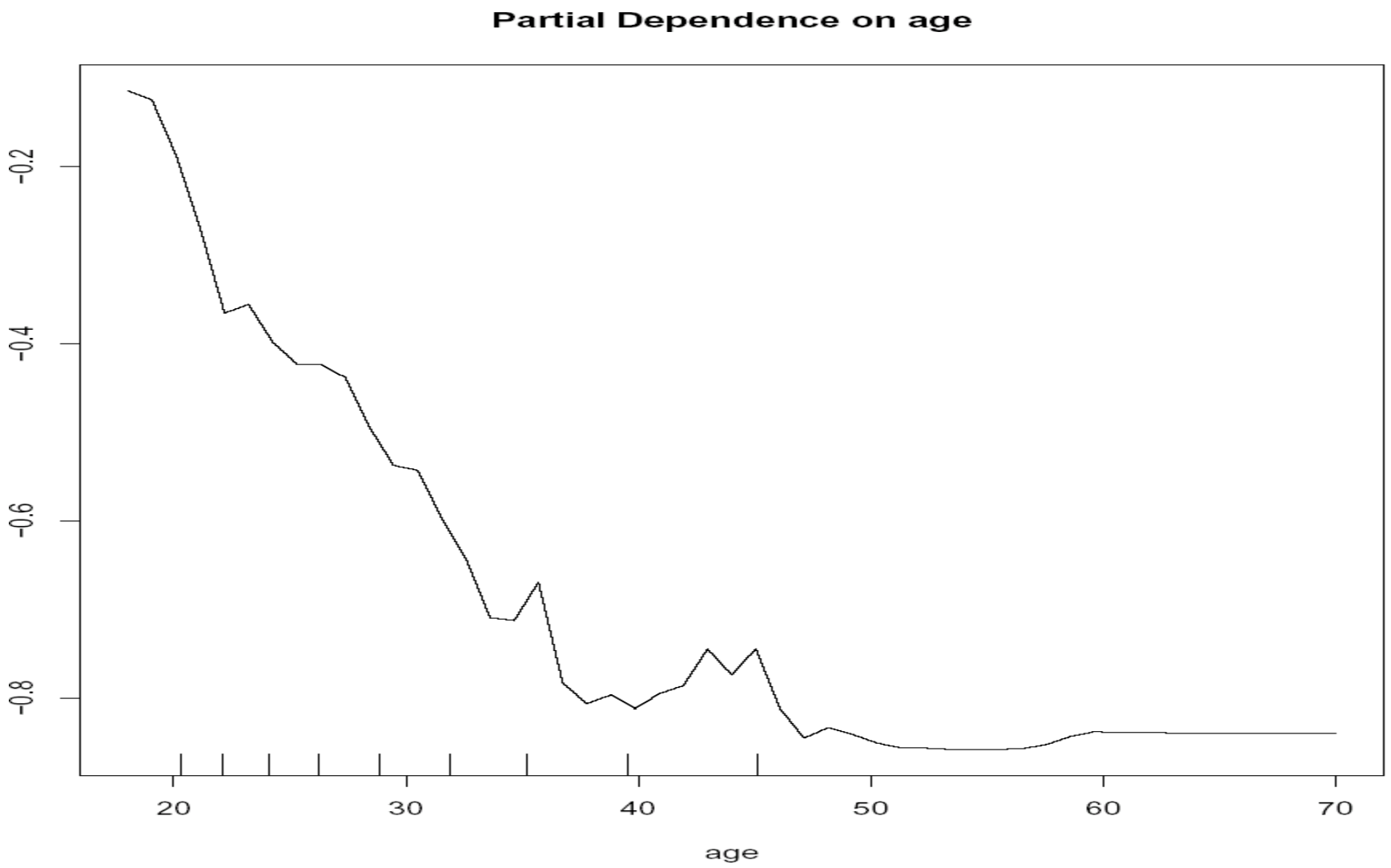
- JOURNAL OF THE ROYAL STATISTICAL SOCIETY
- Berk, Sherman, et al, 2009
- Philadelphia Probation Cases
- 300-400 murders per year
- 1.5 million population
- Rate = 14 X Scotland’s

Average Charges for MURDER or Attempted Murder Within Two Years of Probation Start

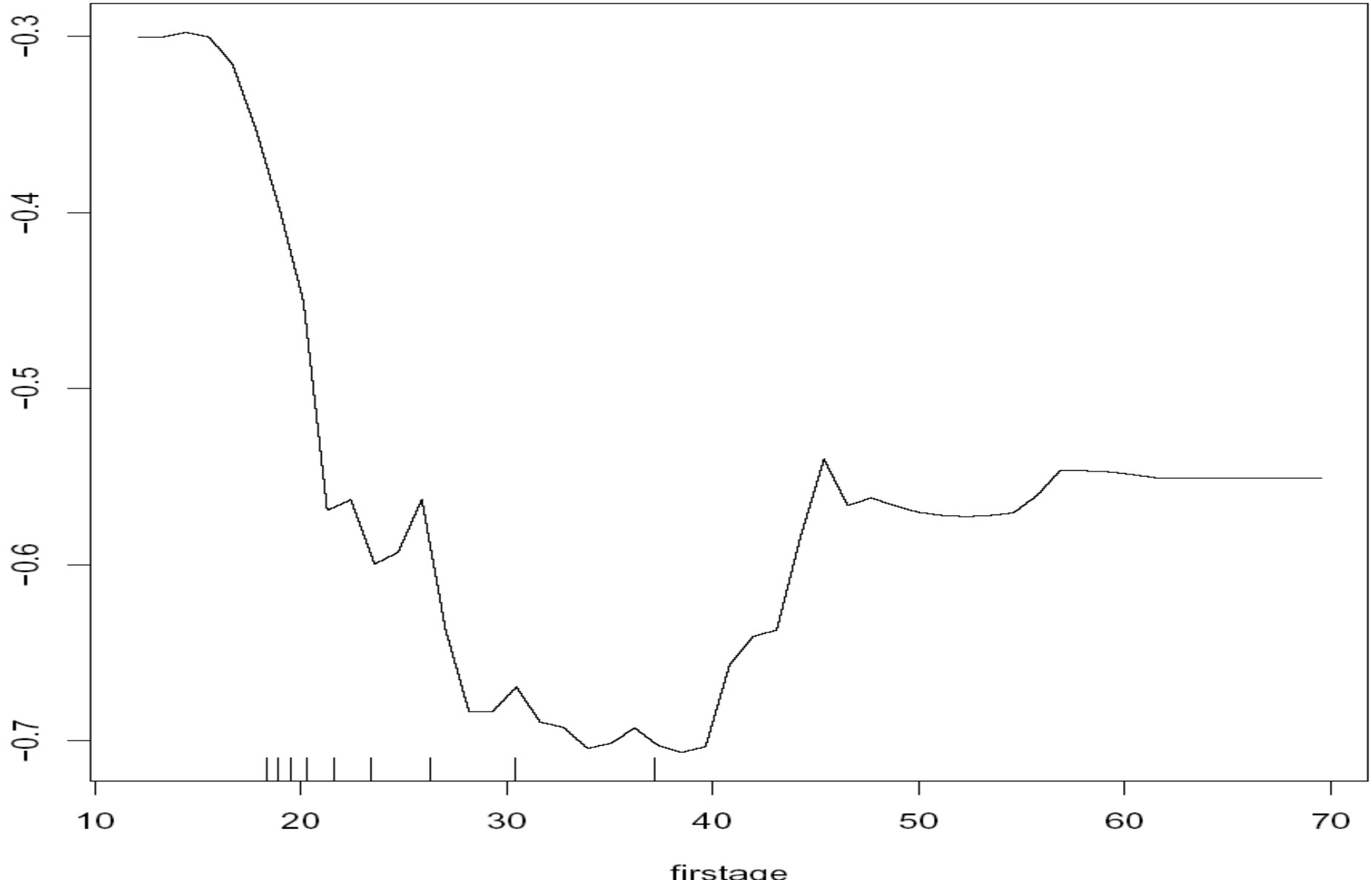
Reds = 75X Blues



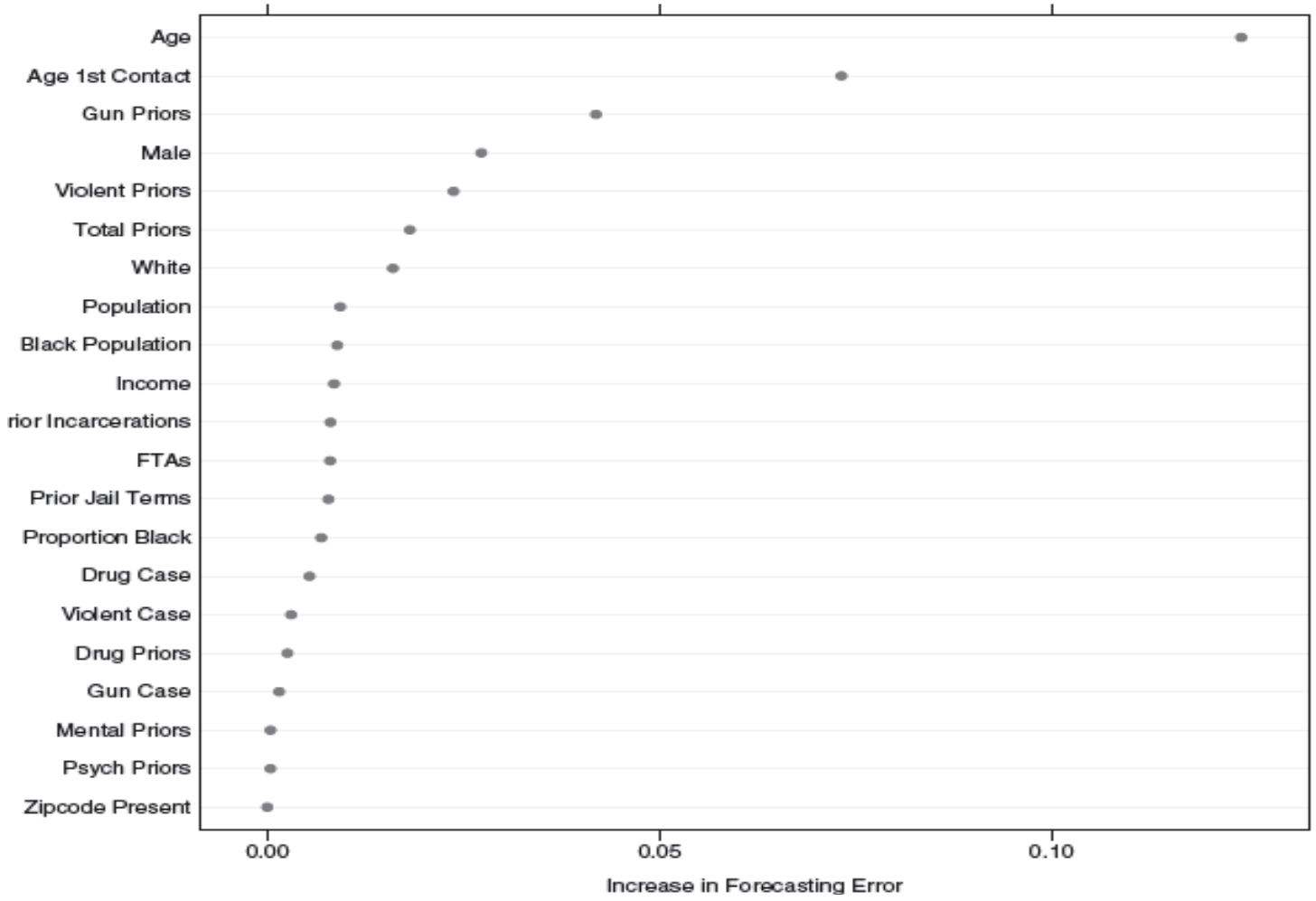
Risk of Murder by Age at Time of Crime (Phila)



Risk of Future Murder By Age of First Adult Disposition



Value of Each Murder Predictor

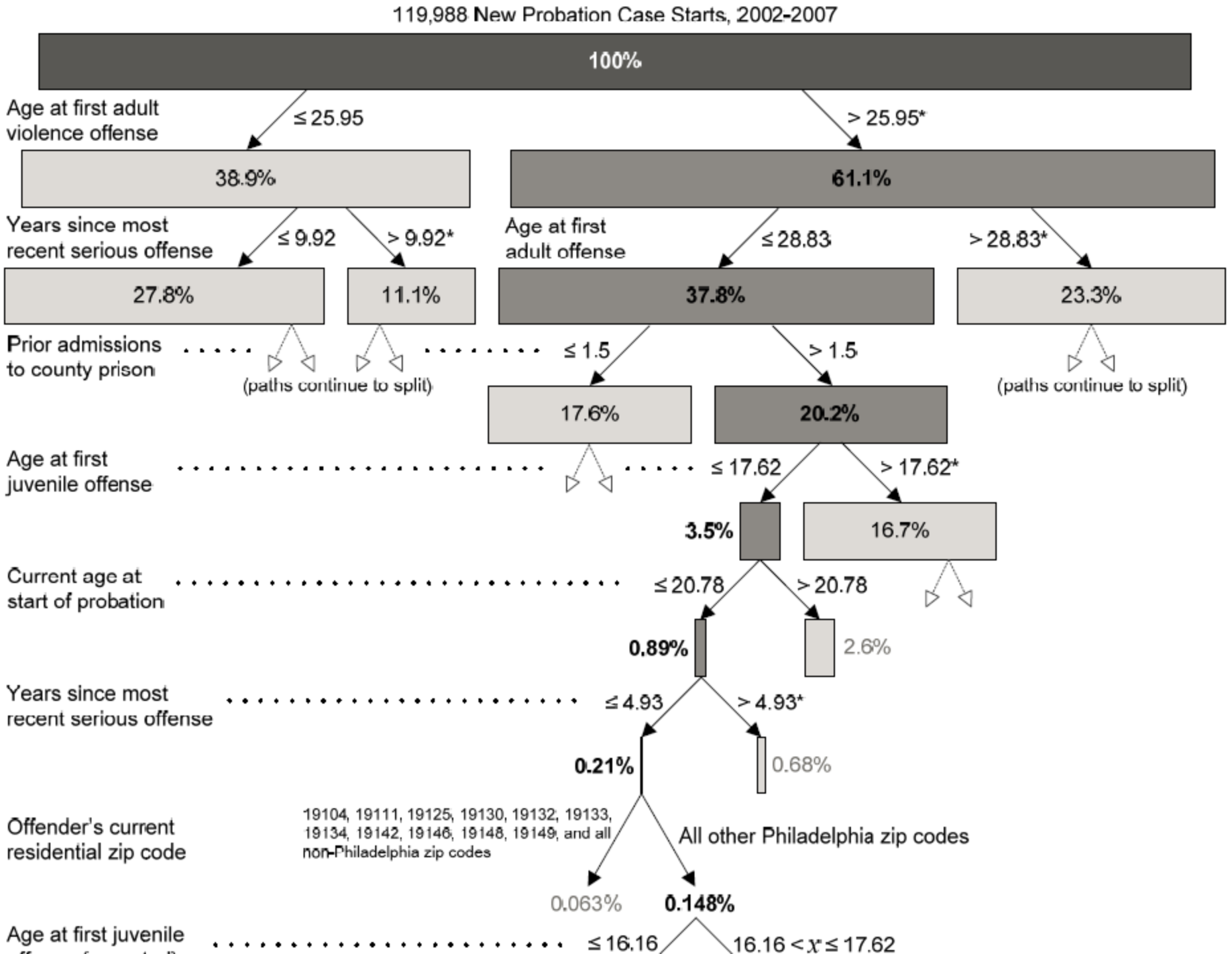


How Does This Work?

Barnes and Hyatt, 2012

Table 1: Simplified confusion matrix for the most recent Philadelphia forecasting model (i.e., Model C), based on construction sample

	Actual High		Actual Non-High		Totals	Percent
Forecast High Risk	**A**	7,112	**B**	11,700	18,812	15.7%
Forecast Non-High	**C**	4,468	**D**	96,655	101,123	84.3%
Totals		11,580		108,355	119,935	
Percent		9.7%		90.3%		


119,988 New Probation Case Starts, 2002-2007
100%
Age at first adult violence offense
≤ 25.95
> 25.95*
38.9%
61.1%
Years since most recent serious offense
≤ 9.92
> 9.92*
Age at first adult offense
≤ 28.83
> 28.83*
27.8%
11.1%
37.8%
23.3%
Prior admissions to county prison
≤ 1.5
> 1.5
(paths continue to split)
(paths continue to split)
17.6%
20.2%
Age at first juvenile offense
≤ 17.62
> 17.62*
3.5%
16.7%
Current age at start of probation
≤ 20.78
> 20.78
0.89%
2.6%
Years since most recent serious offense
≤ 4.93
> 4.93*
0.21%
0.68%
Offender's current residential zip code
19104, 19111, 19125, 19130, 19132, 19133, 19134, 19142, 19146, 19148, 19149, and all non-Philadelphia zip codes
All other Philadelphia zip codes
0.063%
0.148%
Age at first juvenile
≤ 16.16
16.16 < x ≤ 17.62

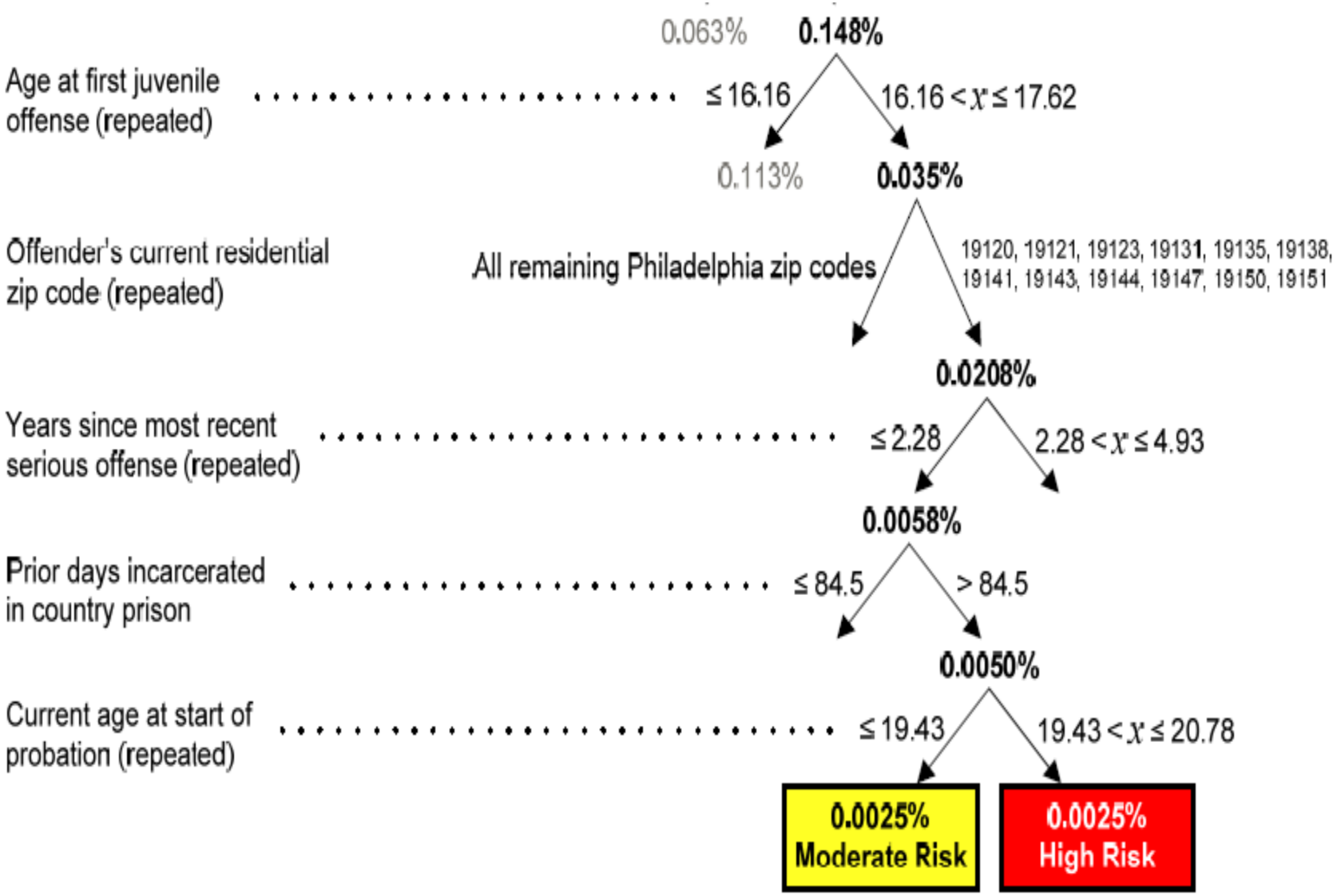


Figure 1: An example of one path through one tree in Philadelphia's latest random forest model

Cambridge Model for England & Wales

- Ioana Cosma, STATSLAB (now Google)
- 100,000 cases
- Convictions in year 2000
- Ten years of Followup
- Data Mining for Serious Offending
- Also for identifying low HARM cases
- Even with high risk of repeats (LOW harm)

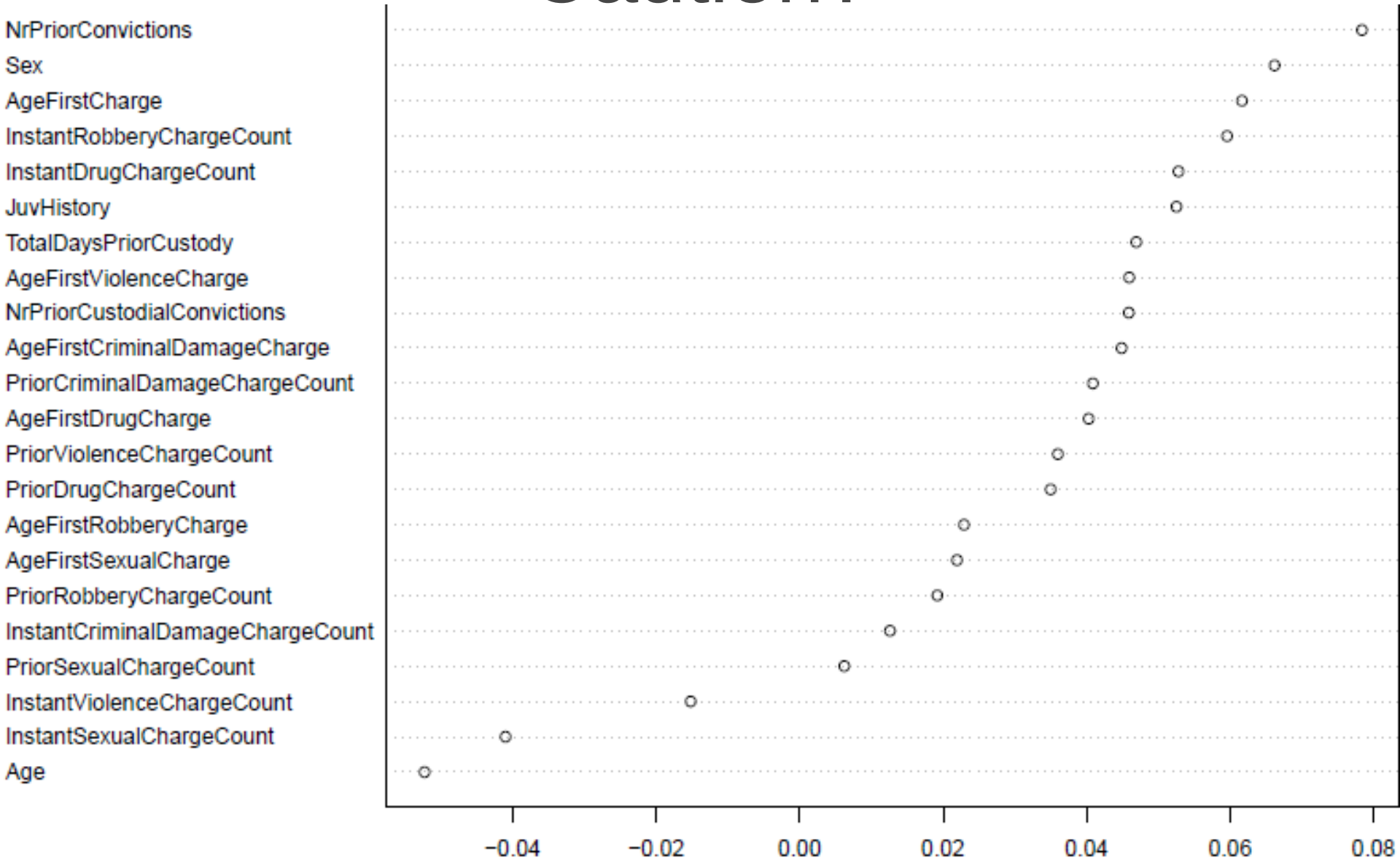
2-year Definitions: England and Wales

Low Harm = NO new crimes over 2 years

Medium Harm = No SERIOUS crimes 2 yrs

High Harm = Violence, Sex crime, robbery

In England, Who Is Safe to Caution?



Error of Low-Harm Forecast

39,598 forecast to be low harm

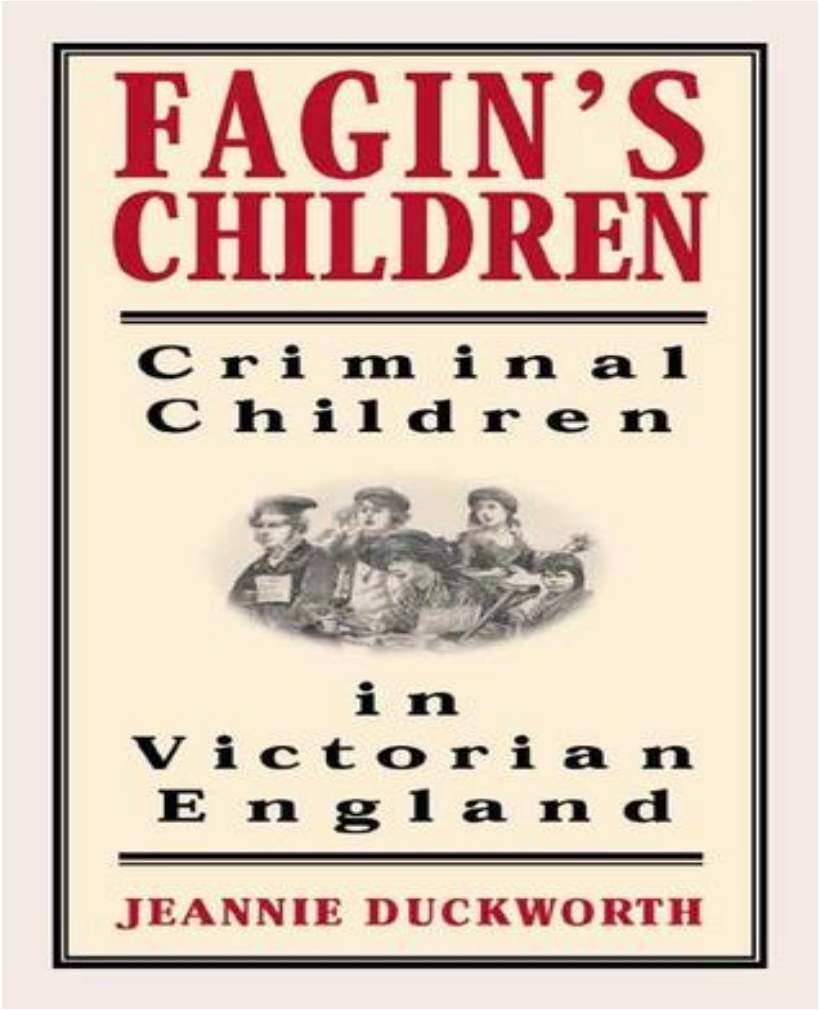
799 were actually high-harm = 2% off

98% Accurate

6719 were high or medium = 17%

83% accurate

What About Fagin?



- Cambridge Master's student
- Ashley Englefield
- Sacramento CA Police Officer
- 8 years of data
- Identified 1,000+
- Crime recruiters
- Younger, 1st offenders

1,092 Typhoid Recruiter Averages

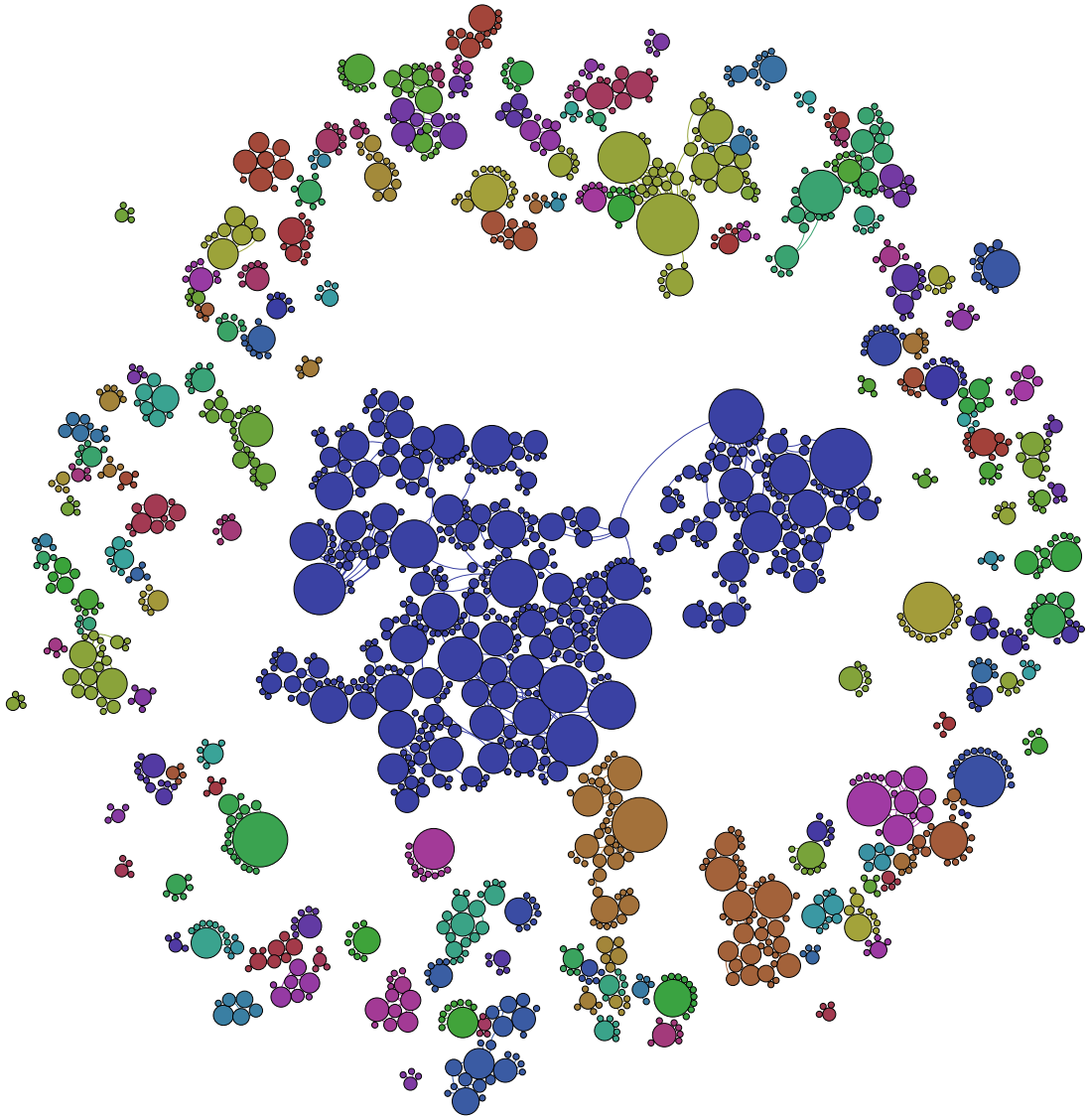
Criminal History	AVERAGE
Arrests	6.37
Solo Arrests	2.39
Total Co-Offenders*	5.44
Younger Co-Offenders	4.01
First Time Co-Offenders	2.11
Average Age Difference	4.04
Average Age of Co-Offender at Arrest	24.55

Network Analysis

Robbery

Typhoid Recruiters - 377

Typhoid Recruits - 1599



II.b Testing
Offender-Focused Practices

- What works better than prosecution?

- What works for whom?
  - --juveniles
  - --adult first offenders
  - --chronic low-harm offenders
  - --episodic high-harm offenders

Youth Offending

- Average effect of 7 experiments
- US, Australia, UK
- Prosecution *increases* future crime
- In some, doing nothing is best

Adult First Offenders

"Offender-desistance policing" (Sherman 2011)

- Birmingham Experiment (P. Neyroud)
- "Turning Point Policing"
- Theft, Burglary, Assault, Fraud
- RCT comparing prosecutable cases by
- Prosecution vs. police management
- Latter is faster, more certain
- 400 cases (200 v. 200) for followup

Strategies for Diversion Under Test

- Restorative justice meeting w/ victims
- Drug treatment
- Alcohol treatment
- Anger management
- Get a job!
- NHS treatment for depression
- Full menu

High-Harm Offenders

- Covert Surveillance
- Washington Experiment
- S. Martin & L. Sherman (1985)
- Increased imprisonment by 400%
- Could reduce total inmate count
- Fewer inmates of higher harm

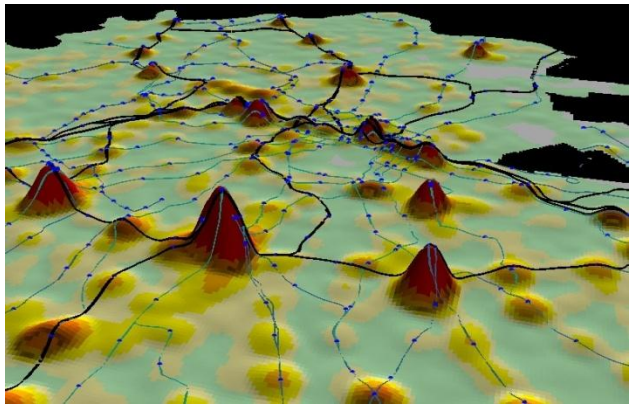
Dale Creegan

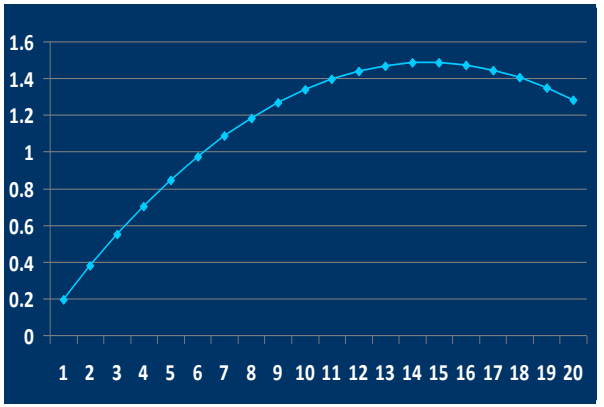
II.c. Tracking Active Criminals

- Few systems in place
- Mostly while on licence
- Exceptions for MAPPA high-harm
- But not yet research-driven
- Great potential for targeting, testing
- Door-knocking?
- Sacramento experiment with recruiters
- Preliminary results show less crime

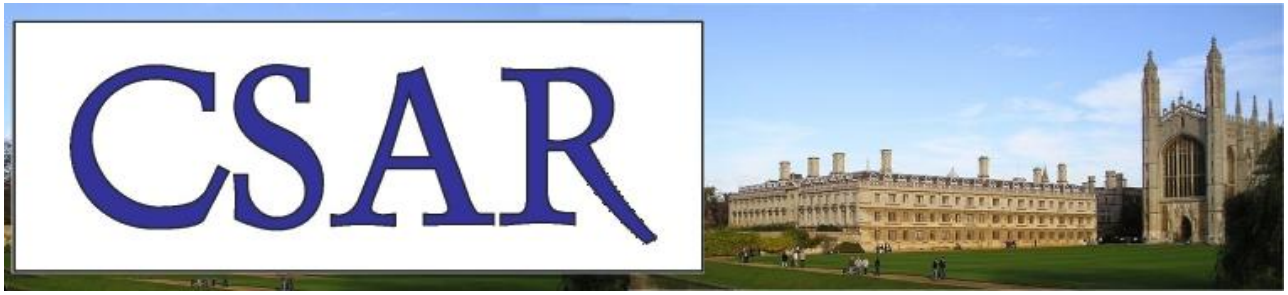
Summary: We Know a Lot and Learn More Each Day, But Will Crime Prevention Professions *Apply* This Growing Body of Research?

- Professions never defined themselves as dependent on research before
- Neither did medicine until early 1900s
- Crime is century behind disease
- But police are catching up fast
- Other professions are slower
- Thirst for better results is a great incentive
- That's why we're all here!





Thank You



50 years

Lawrence W. Sherman

Institute of Criminology, Cambridge University

3d February 2014