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ARE POLICE ABLE TO USE GPS TO TAKE ADVANTAGE OF UNALLOCATED PATROL TIME AND CAN THAT HAVE MEANINGFUL IMPACTS ON CRIME?



ALTERNATIVE TITLE: WHAT I REALLY LEARNED ABOUT HOT SPOTS PATROL AND ITS EFFECT ON CITY WIDE CRIME RATES.



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# Turning Unallocated Patrol Time to Crime Prevention: How we began

- In the Middle Ages, philosophers and scientists sought relentlessly to find the secret of turning base metals into gold. (Alchemy)
- Over the last century, police practitioners and scholars have been as relentless as the medieval Alchemists in their efforts to turn time on ordinary police patrol into crime prevention resources.
- Logic:
  - The vast majority of resources in policing are used for the patrol function (Bayley, 1994; Kelling, Pate, Diekman, and Brown, 1974). If unallocated patrol time could be utilized for crime prevention, the police could make better use of their largest personnel resource to respond to crime.

# An Opportunity in Dallas, Texas

- AVL technology is a means for knowing where the police are and allows the tracking of on call and unallocated time.
  - Many departments have AVL technologies in place but often they are not in all patrol vehicles.
  - Often agreements with unions prevent their use for tracking police patrol.
  
- Dallas Texas has used AVL technology since 2000.
  - All police vehicles were equipped with AVL when our experiment began in 2010.
  - Police management could use AVL for tracking where police patrol was concentrated (but not for tracking individual officers).
  
- Police management wanted to increase their focus on crime through their directed patrol activities in beats and hot spots.

# Key Questions of our Study: What the Experiment Could Tell Us Directly

- Could Knowledge of unallocated patrol time be successfully used to redirect such resources to higher crime beats or crime hot spots?
  - ▣ Does this lead to general deterrence at either the beat or hot spot levels?
- The answers reinforce what we know.
  - ▣ Police should focus on hot spots and not on large geographic areas.
  - ▣ Increased use of unallocated time at hot spots has a deterrent effect at hot spots.-- But we found no evidence of crime prevention impacts at a larger scale.

# What I learned that was unexpected (“the wrong horse for the wrong course”—Tilly)

- We have very strong evidence that hot spots policing reduces crime at hot spots without displacement.
- We know very little about how hot spots policing can be implemented in ways that reduce city wide crime rates.
- What I learned was that the key to city wide impacts of hot spots policing lies in what Sherman et al. call a management theory for “what works in leading police service delivery on a large scale.”
- Put simply: if the police could maximize the use of free time in the pursuit of hot spots policing they would have major impacts on crime.



# The Dallas AVL Experiment

# Research design

- The experiment was conducted for 13 weeks.
- It was conducted at two levels:
  - The Beat level which was the level that patrol allocations were made in the department. There were 236 beats randomly allocated to treatment and control conditions.
  - Directed Patrol Hot Spots. At each Compstat meeting division commanders were asked to identify hot spots (including one or two streets) for each watch per division per week for inclusion in the experiment.

# The Treatment: Beat Level

- Commanders were asked to specify each week during the experiment, the amount of patrol they wanted for each beat.
- Commanders were given each week a form which listed the amount of patrol that actually was delivered in each beat the prior week and the “level” of crime in each beat.
  - ▣ They were supposed to try to increase patrol at high crime beats and decrease patrol at low crime beats.
- For the Control Beats allocation forms were filled out but the Commanders received no information on actual patrol.



# The Treatment: Hot Spots

- Commanders at the weekly Division Compstat Meetings were asked to identify up to five priority hot spots for inclusion in the study within each beat within each watch.
  - ▣ In only 7% of the cases was this threshold reached.
- Feedback forms on how much patrol was actually brought to the hot spots, was only given in the experimental beats.



How much unallocated time do patrol officers in Dallas have?

# Unallocated Patrol Time in Prior Studies

- In prior studies they often include break times, traffic stops, and discretionary back up time as “free time.”
  - ▣ In studies in Kansas City (Kelling et al., 1974), Indianapolis, and St. Petersburg (Matrofski et al., 1998), and 24 police agencies in the Rochester, St. Louis, and Tampa-St. Petersburg metropolitan areas (Whitaker, 1982), between 60 and 75 percent of time on patrol was identified as non-committed.
  - ▣ In Baltimore, more than 80 percent of patrol time was found to be unassigned (Famega, Frank, and Mazerolle, 2005).
  - ▣ In Cincinnati the proportion was only about one third (Frank et al., 1997).
  
- In Dallas, unallocated time is time that is not assigned on the call system. It is time that can be utilized!

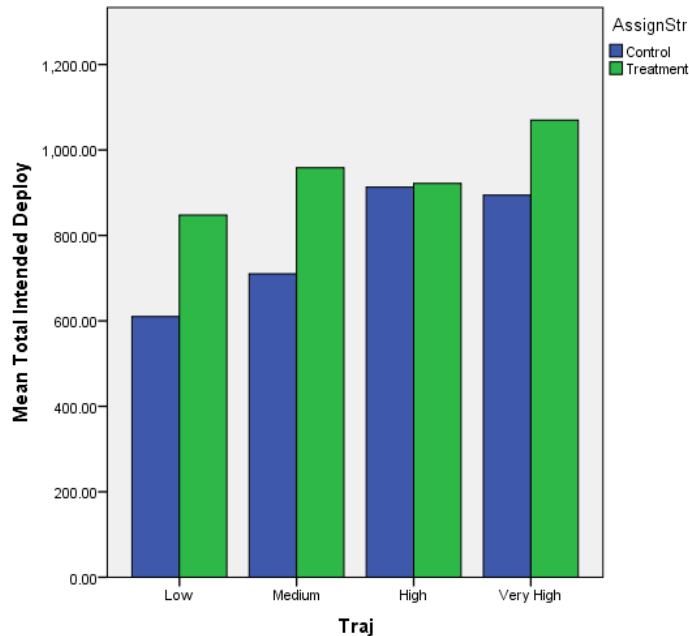
Table 1. Proportion of Unallocated Patrol Time (by week)

Week	Unallocated Hours	Patrol Hours	Unallocated %
1	5,297.78	20,950.67	25.29%
2	5,429.99	21,699.50	25.02%
3	5,438.90	21,690.64	25.07%
4	5,195.06	21,553.91	24.10%
5	5,431.13	21,718.82	25.01%
6	5,536.80	20,868.72	26.53%
7	4,837.79	20,400.87	23.71%
8	4,879.88	20,178.69	24.18%
9	5,445.73	21,136.88	25.76%
10	4,964.02	20,648.68	24.04%
11	5,138.15	21,178.87	24.26%
12	5,162.18	20,390.97	25.32%
13	4,948.94	19,938.91	24.82%
Total	67,706.35	272,356.14	24.86%

# Findings: Beat Level

# Does AVL Influence What Commanders Expect of Patrol Officers

## Assigned Patrol By Trajectory Group

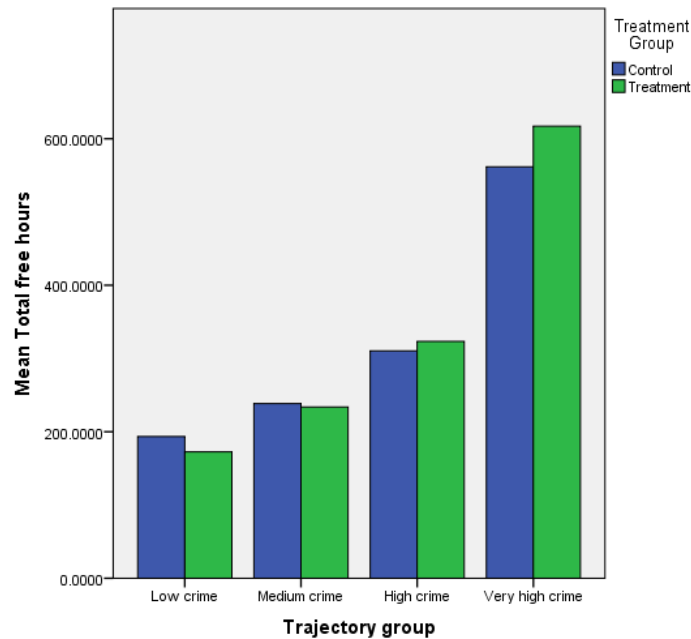


## Overall Mean; Significance

- 17% Increase in Treatment Group;  $p < .001$
- The interaction Effect =  $p < .05$ . But it is not in the direction only of increasing patrol in high crime beats.

# Does AVL Influence Actual Unallocated Patrol Time?

## Unallocated Time by Trajectory Group



## Means; Significance

- 1% Increase in Treatment Group; NS.
- Interaction Effect; NS.

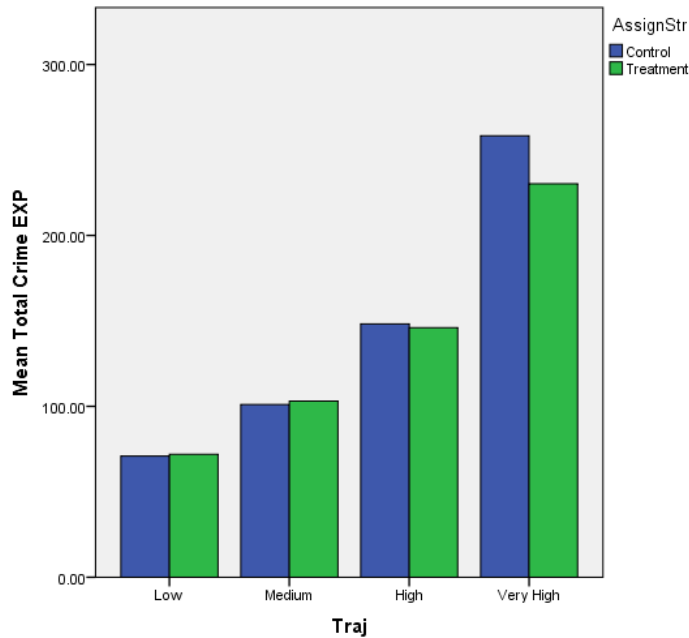
# Some indication of stronger relationship between unallocated patrol time and crime.

Table 4. Spearman Correlations Between Crime Trajectory Group and Unallocated Patrol Time (Beats, by week)

	Treatment (N = 116)	Control (N = 116)
Overall	0.41	0.32
Week 1	0.39	0.32
Week 2	0.40	0.33
Week 3	0.40	0.33
Week 4	0.36	0.30
Week 5	0.45	0.39
Week 6	0.38	0.29
Week 7	0.35	0.27
Week 8	0.34	0.32
Week 9	0.44	0.27
Week 10	0.38	0.27
Week 11	0.41	0.31
Week 12	0.37	0.25
Week 13	0.38	0.33



# Does AVL Influence Crime at the Beat Level?

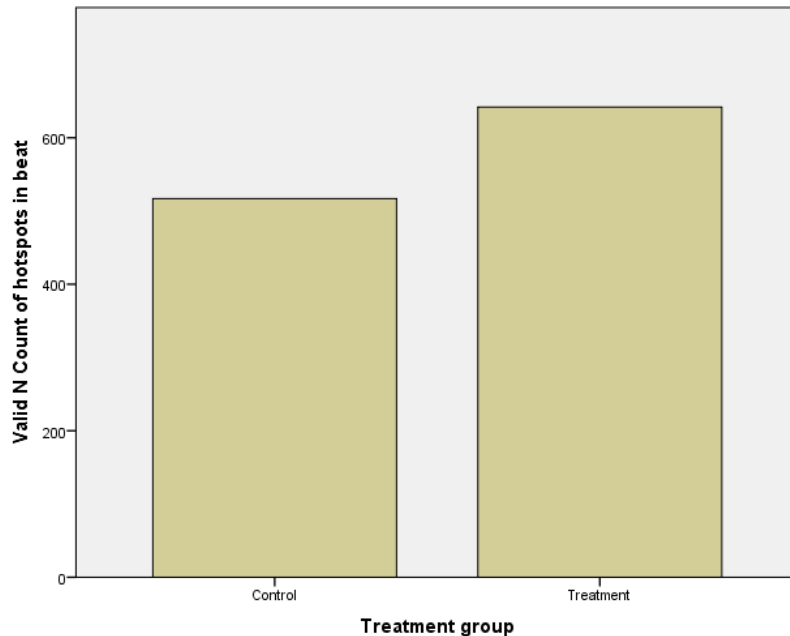


- 2% decrease in Treatment Group; NS
- Interaction, NS

# Findings: Crime Hot Spots

# Did AVL Change the Expectations re How Many Hot Spots?

## Number of Hot Spots Identified

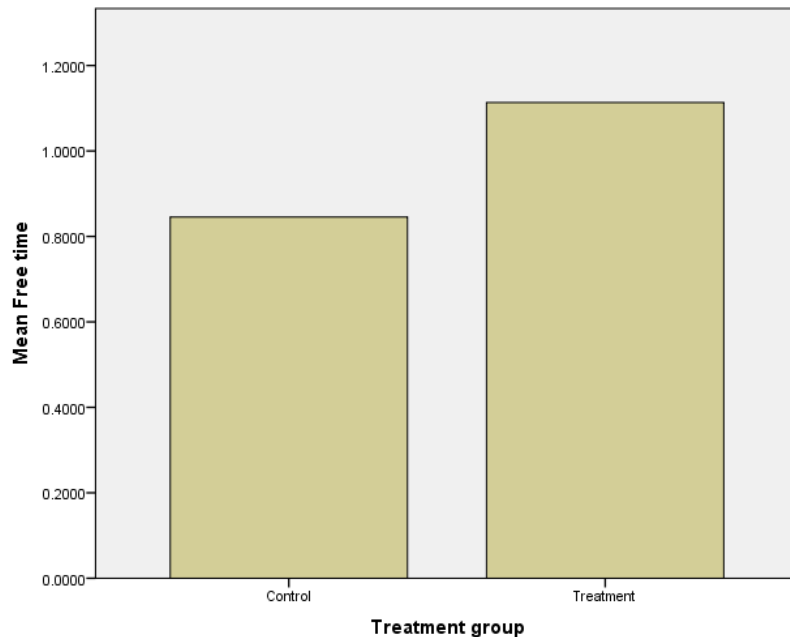


## Difference; Significance

- 25% Increase in The Number of Hot Spots Identified.
- Significance;  $p < .001$
- No statistically significant difference for the average amount of time at hot spots.

# Did AVL Increase the Unallocated Time at the Hot Spots?

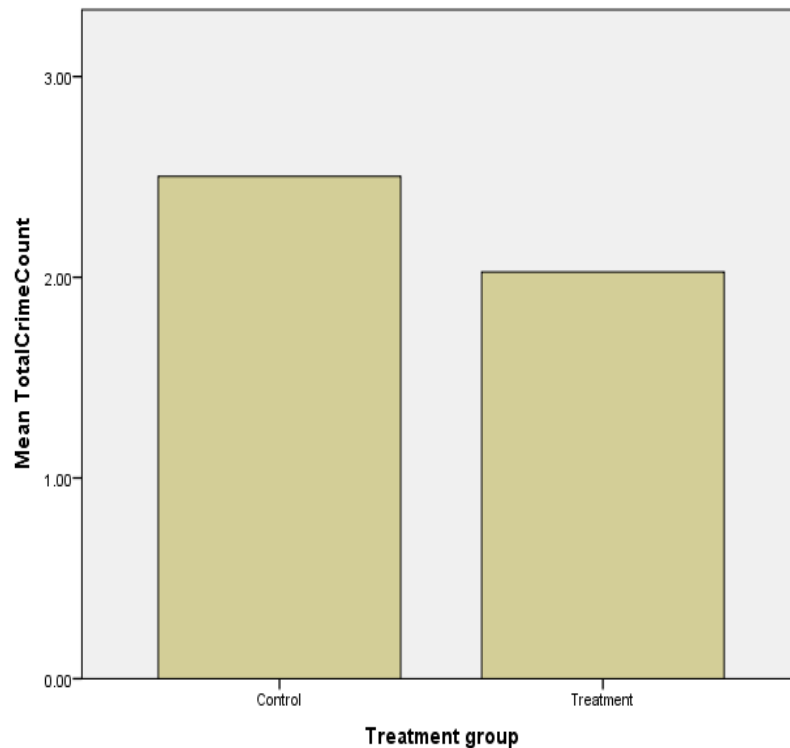
## Differences; Significance



- The Treatment Hot Spots Received on Average About 27% More Unallocated Patrol Time.
- Significance;  $p < .05$ .

# Was Crime Reduced at the Treatment Hot Spots?

## Mean Logged Crime by Treatment Group



## Difference; Significance

- 18% Reduction in Crime in the Treatment Group.
- Significance;  $p < .05$

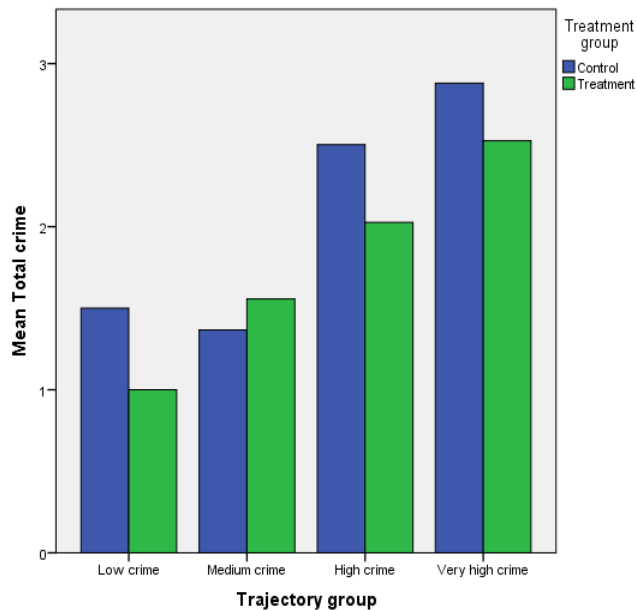


Why Wasn't Crime Reduced in the City Overall if it was  
Reduced at Hot Spots?

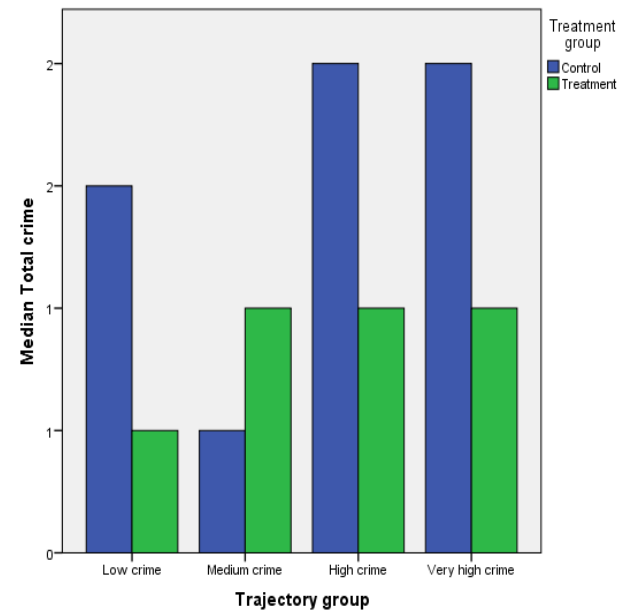
Or the real issue is— Rethinking the Management of Patrol  
Resources in policing.

# Hot Spot Impact on Crime

## Average Crime at Hot Spots by Trajectory Group

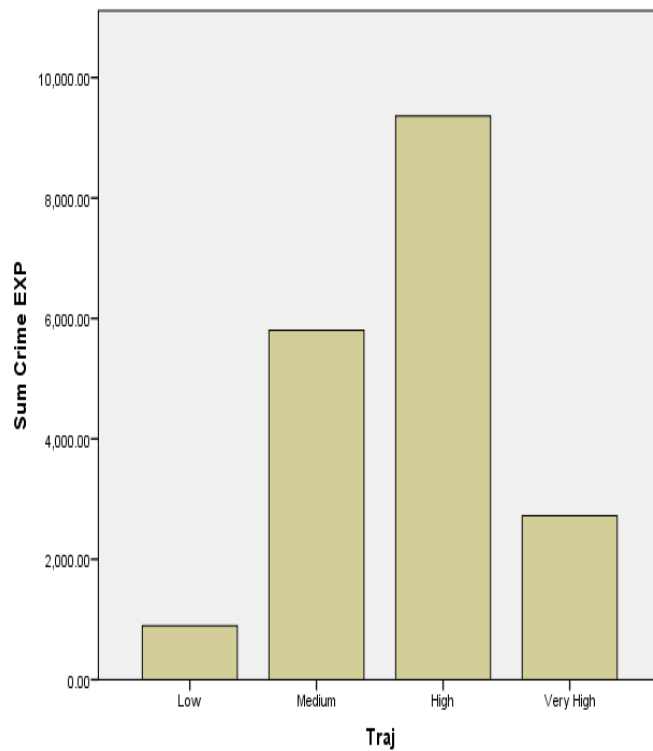


## Median Crime at Hot Spots by Trajectory Group

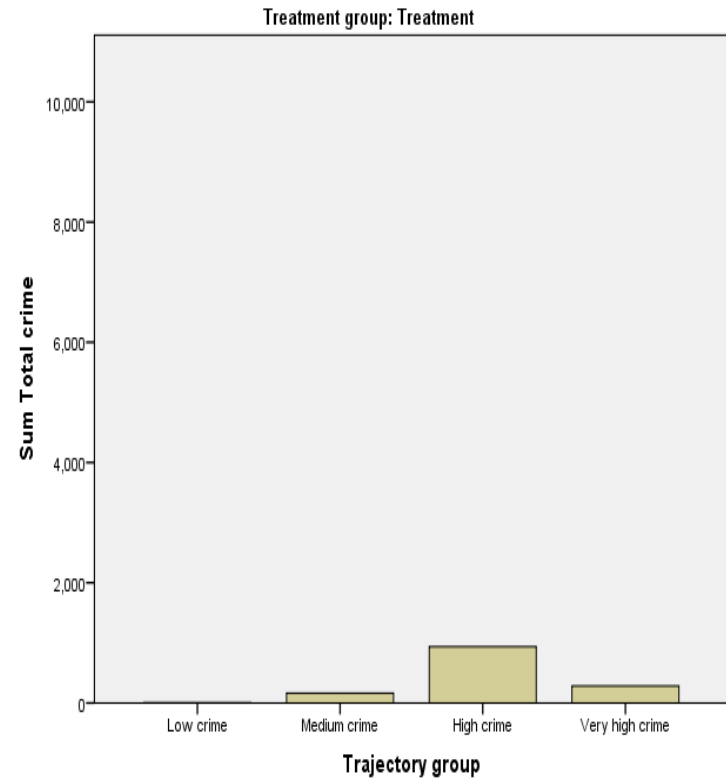


# But are the numbers important relative to crime overall?

## Beat Level Sum of Crime in Trajectory Groups in the Experiment



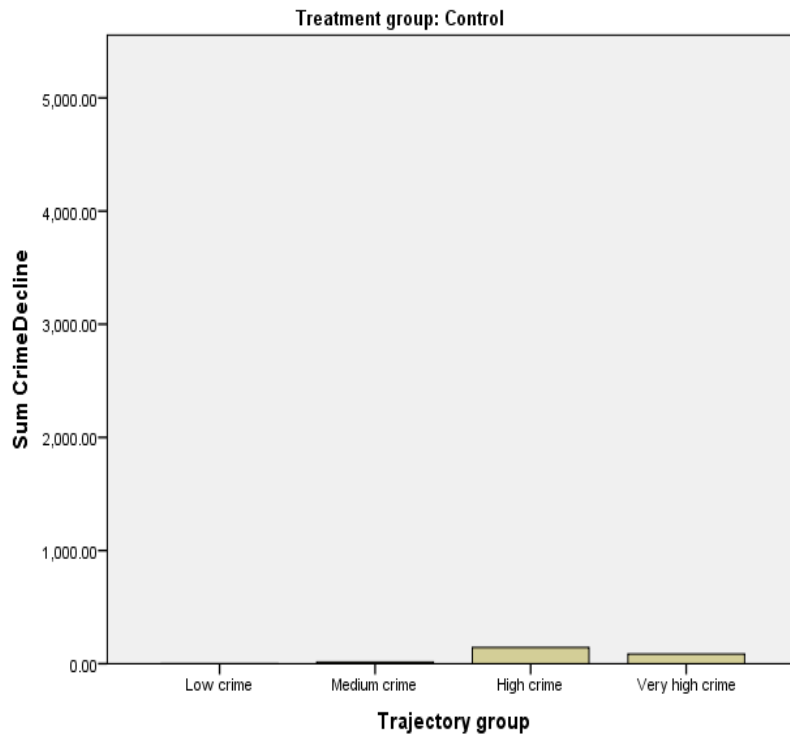
## Sum of Crime in Hot Spots in Treatment Group



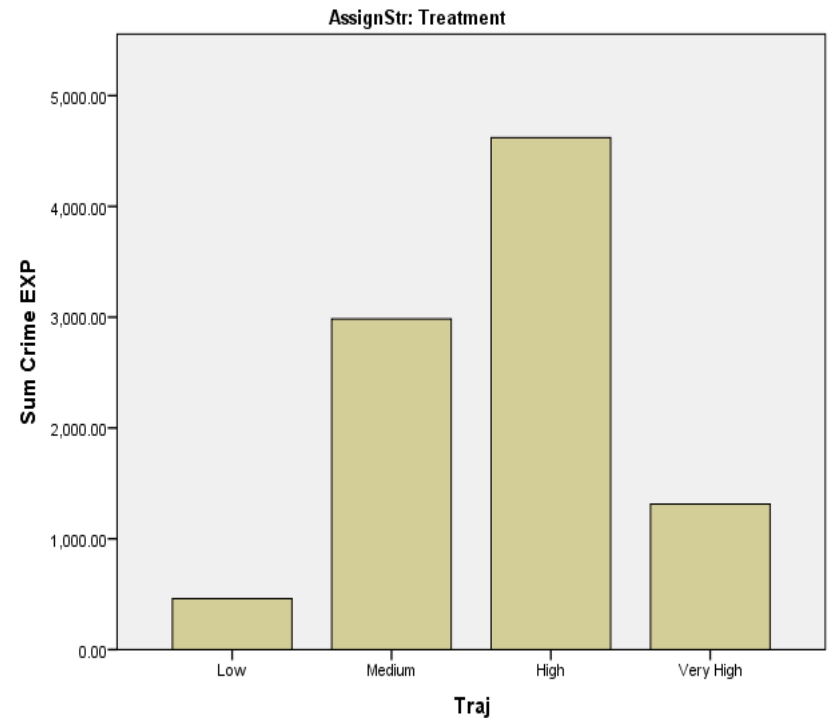


# “Drop in the Bucket”

Estimated Total Deterrence Based on Difference Treatment and Observed in Hot Spots by Trajectory Group



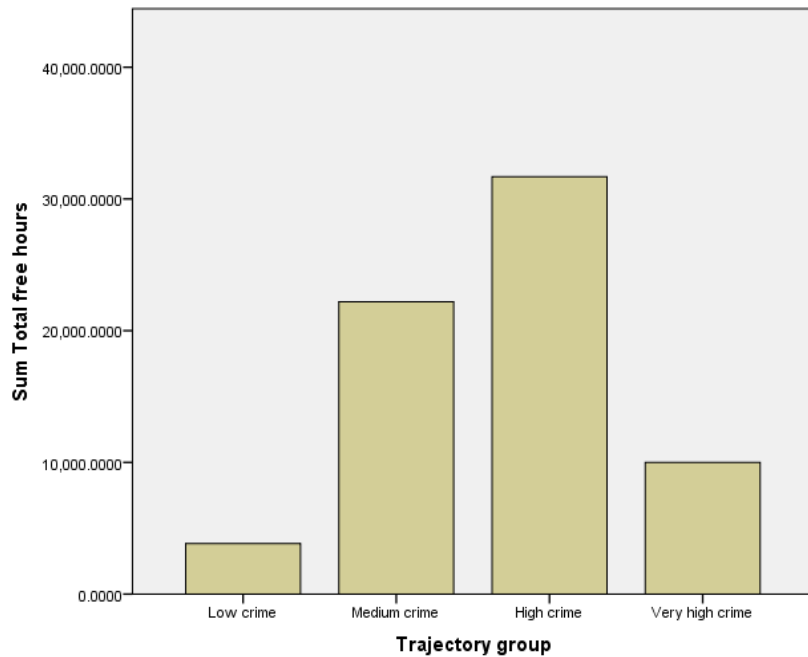
Total Crime in the Treatment Beats by Trajectory Group



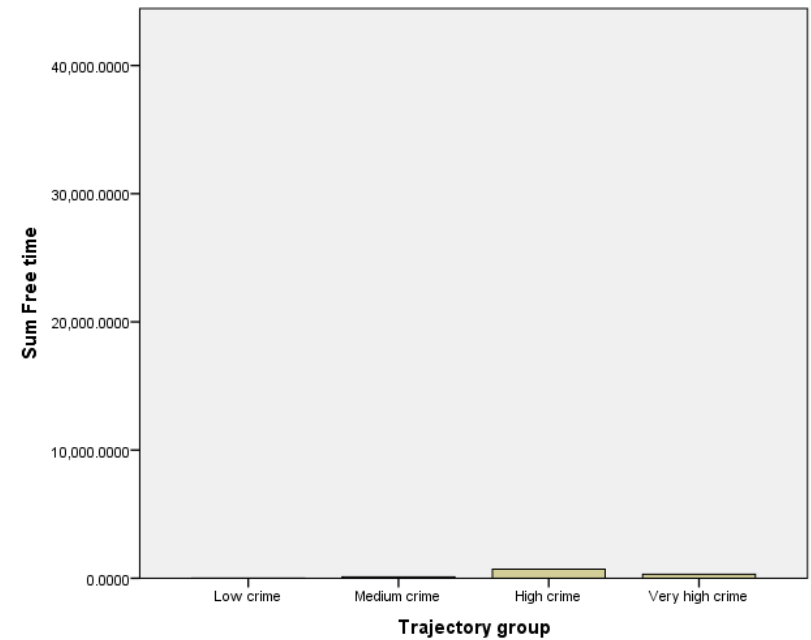
Estimate of deterrence gained by multiplying treatment effect (.18) by totals for the control condition.

If we want an effect we need to be able to allocate more unallocated time to hot spots patrol!

## Unallocated Patrol Total

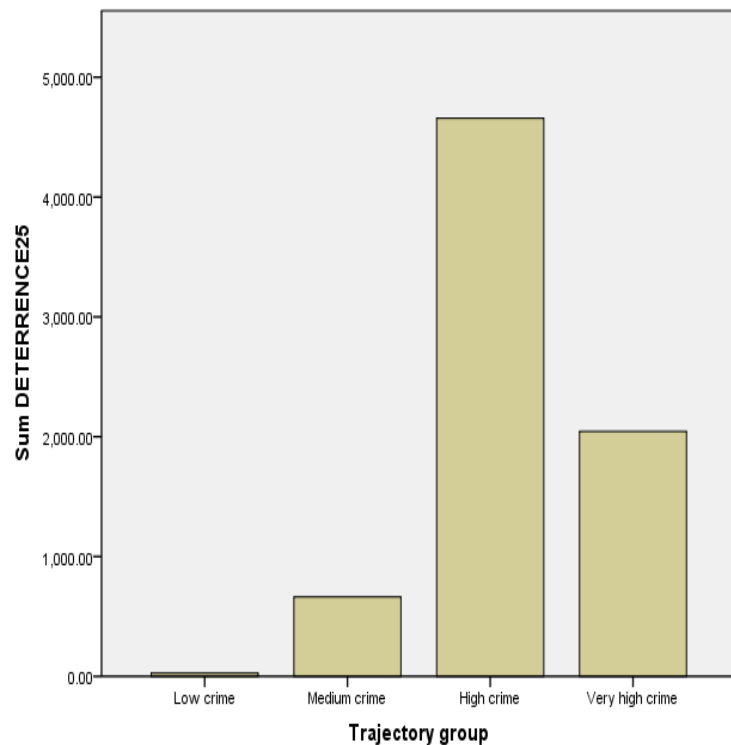


## Unallocated Patrol Devoted Toward Hot Spots

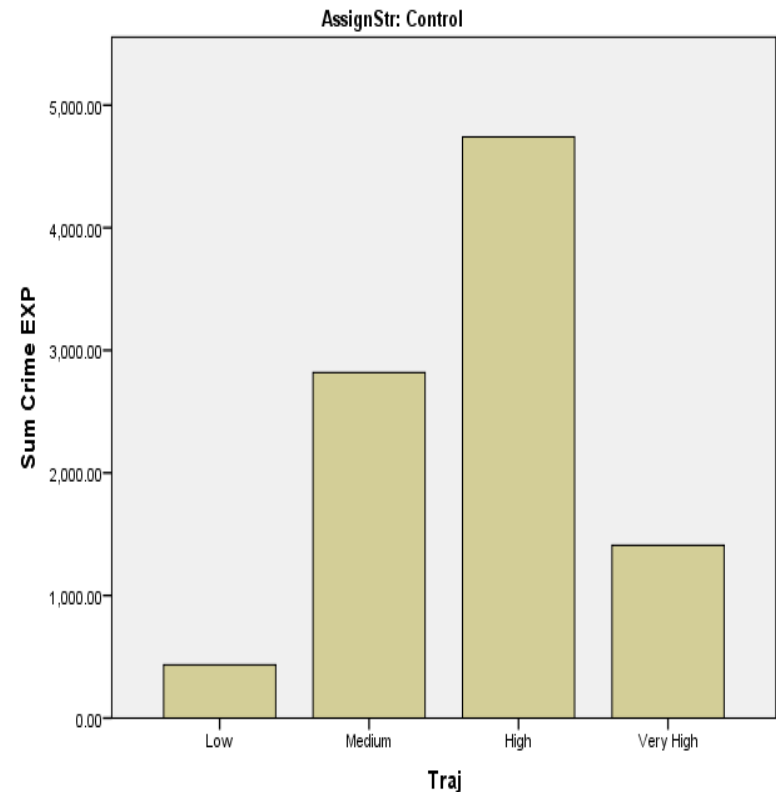


# What if we could use 25% of unallocated time for crime prevention?

Deterrence effect based on 25% of unallocated patrol time on hot spots patrol.



Total crime in the trajectory groups.



Based on utilization of 25 % of unallocated total patrol and same deterrence.



What did we learn?

# About Harnessing Unallocated Patrol time in beats...

- Police commanders were not successful in using unallocated time to focus on crime prevention.
  - They could not take advantage of that time to increase patrol in the high crime experimental beats.
- Why?
  - Commanders are trying to maximize multiple goals at the same time.
    - In particular the “rapid response” philosophy remains key to understanding patrol allocations.
    - They want “elements” throughout the city. (Rising expectations across the beats).
    - “Push and Pull” of crime prevention and rapid response.

# About AVL and Hot Spots Patrol...

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- The commanders were successful in bringing more time to crime hot spots.
- This not unexpectedly led to relative crime declines.
  - ▣ At about the rate found in other hot spots studies.

# About the ability of hot spots patrols to have jurisdictional impacts...

- In Dallas crime prevention at crime hot spots was a “drop in the bucket” of crime in the city. True in other cities?
- But if we could increase the amount of unallocated time we could bring to hot spots we could likely have significant effects on crime in the city.
  - ▣ This is based on a number of assumptions including little or no displacement.
- We need a focus on how we can do this:
  - ▣ “Despite a flourishing body of research (if not formal theory) on the *effects* of hotspots policing, there is neither theory nor evidence on what actions police leaders should take to create and maintain the *causes* of a successful hot spots patrol strategy.” (Sherman et al., 2014)

# About the importance of police led experiments...

- If management questions are central to advancing to the next generation of hot spots policing...
- Then police led experiments are clearly key to the future of such studies.
  - ▣ Or perhaps another way of saying this is that the police must take ownership (or co-ownership) of police experiments (Weisburd and Neyroud, Police Science).
- We will have to dig deeper into the everyday world of police management if we are to take crime prevention to the next level.