

# Predictive Policing Pilot Evaluation

June xxxx, 2016

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NYC0000802

# Pilot Background

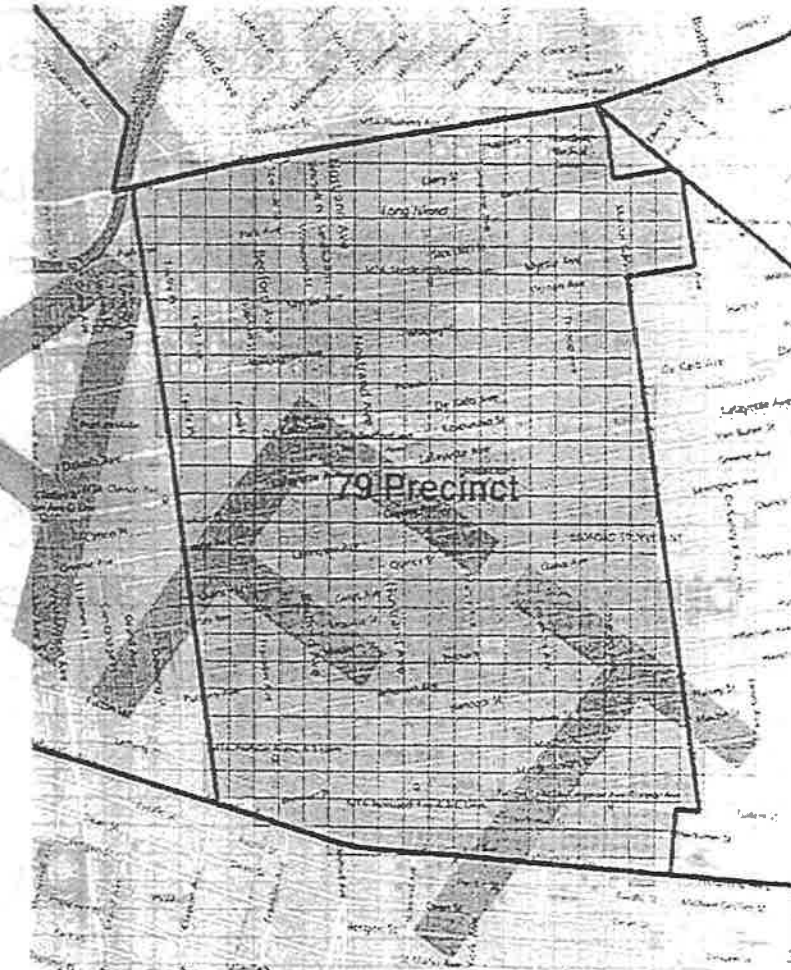
- “Predictive policing” refers to the prediction of a limited number of geographic boxes, estimated to have the highest risk of crime, for an upcoming time window
- Three external vendors bid to participate in a **no-cost** NYPD predictive policing pilot: PredPol, Azavea (HunchLab), and KeyStats
- OMAP and the Predictive Policing Committee, including DCO, OCD, CTB, and ITB, established the framework for the pilot and the evaluation

# Pilot Parameters

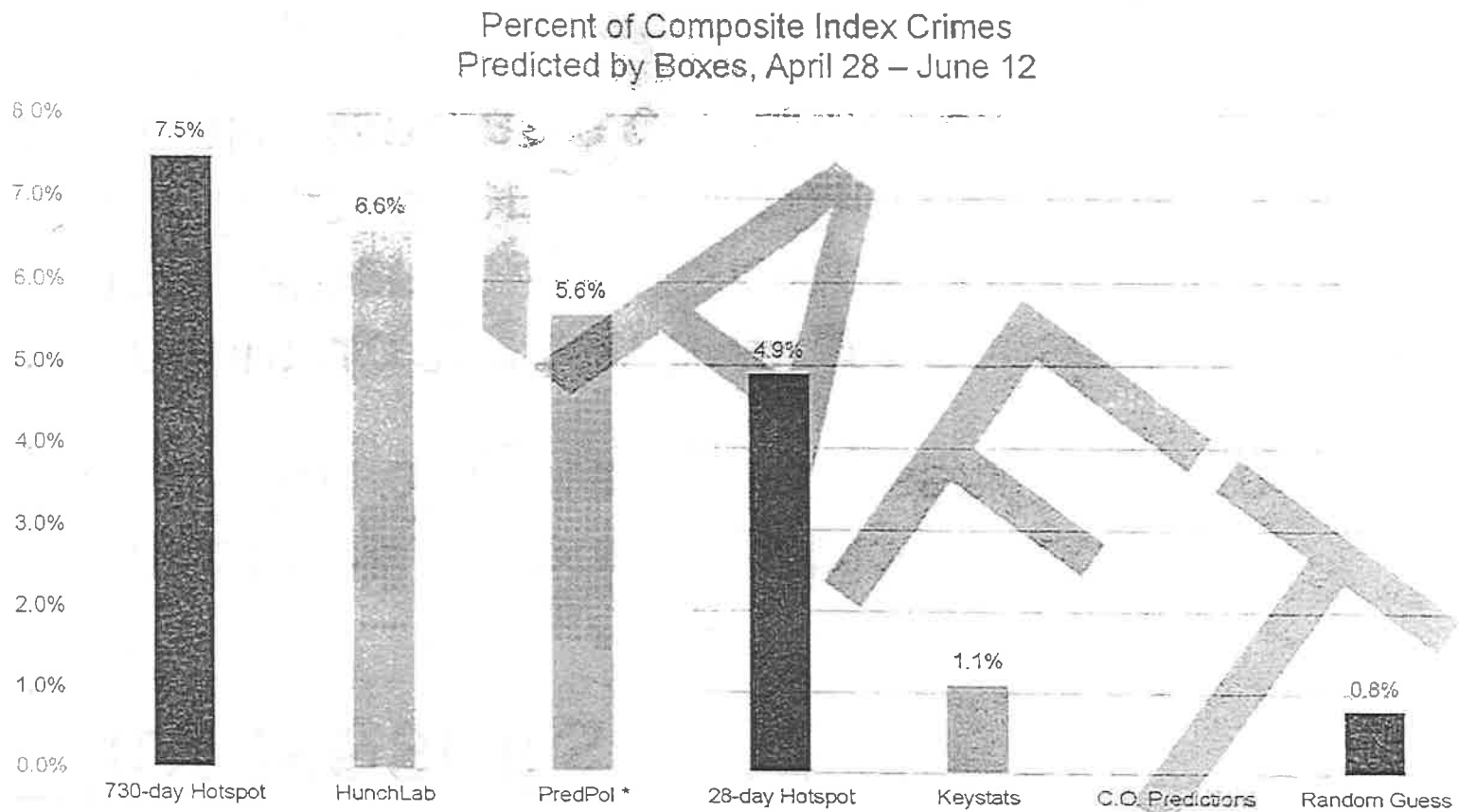
Predict five 300' x 300' boxes:

- Per precinct\*
- Per platoon
- Per crime type:
  - Robbery
  - Fel. & Misd. Assault
  - Burglary
  - Grand Larceny from Person
  - Grand & Petit Larc. from Auto
  - Shooting incidents
  - Plus one composite of all six crime types

\* Vendors were also asked to provide an additional set of predictions for 1% of each patrol borough



# Pilot Results: Composite Index



\* PredPol submitted predictions through the first platoon of 5/18 before withdrawing from the pilot.

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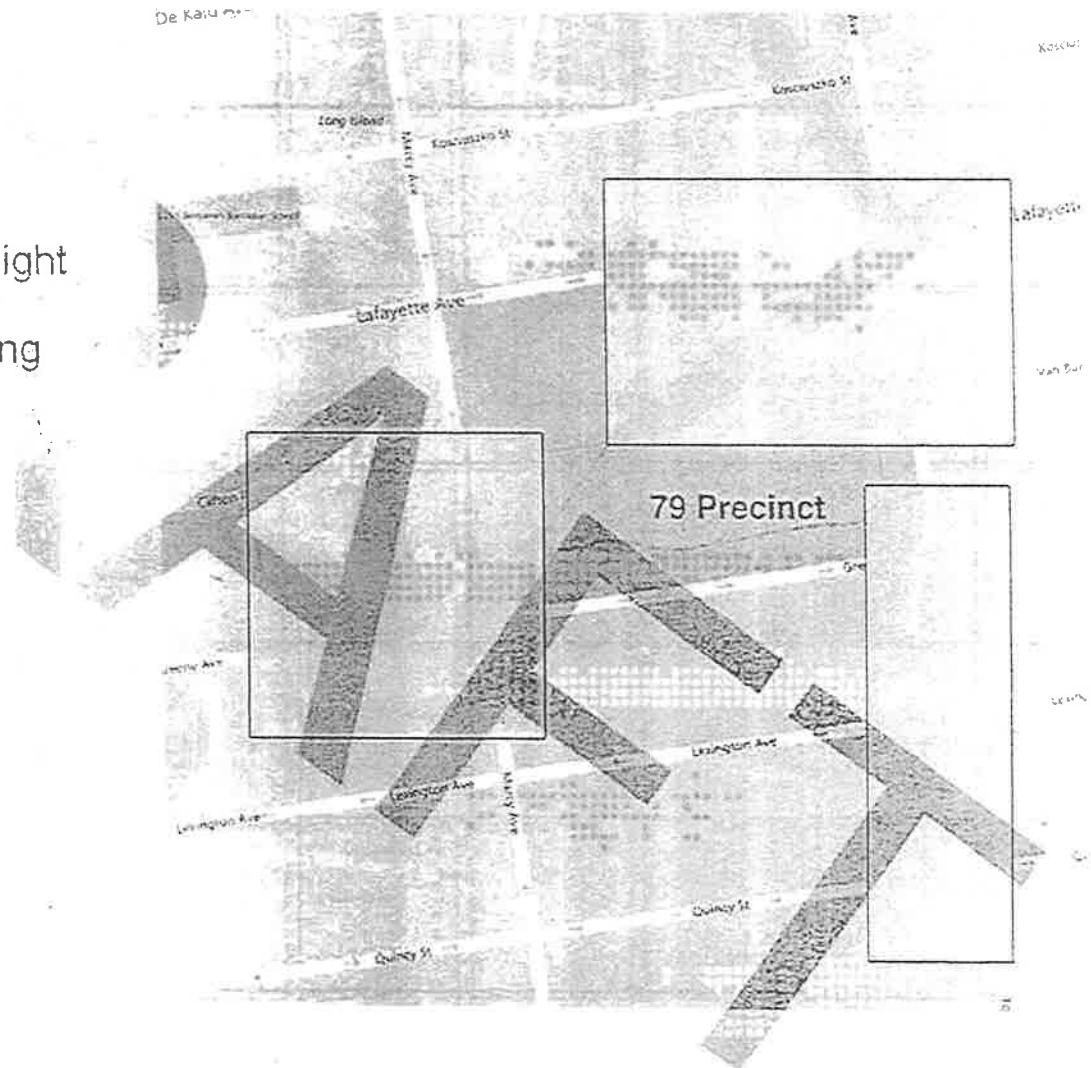
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# Pilot Design

- Predictive Policing Committee designed the pilot in order to **maximize fairness of comparison** across vendor products
- In some ways, the pilot design does not reflect the exact products that vendors may provide a police department under contract
- The following slides examine some key differences between the design of this pilot and a typical vendor predictive policing product

# Pilot Design: The Grid

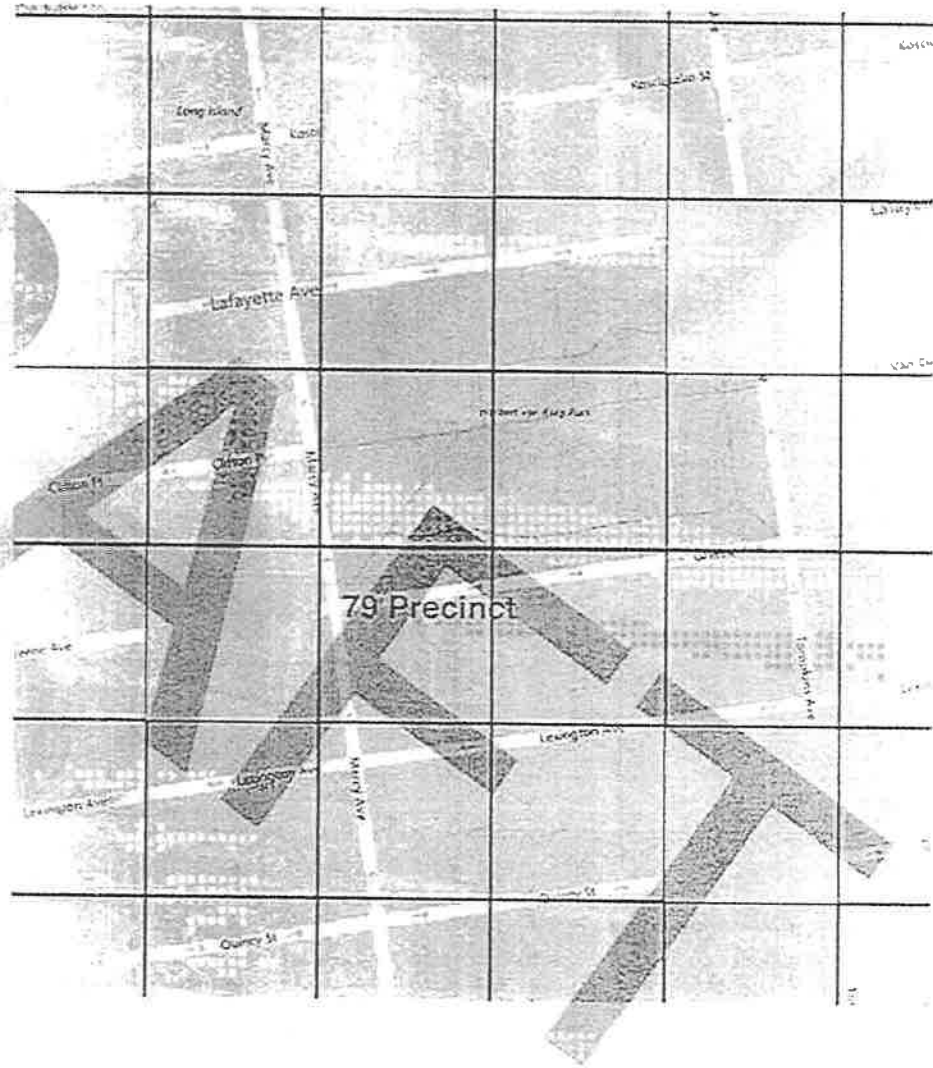
A typical vendor product might allow prediction boxes to move freely, as well as using 500' x 500' boxes; or even rectangles.



# Pilot Design: The Grid

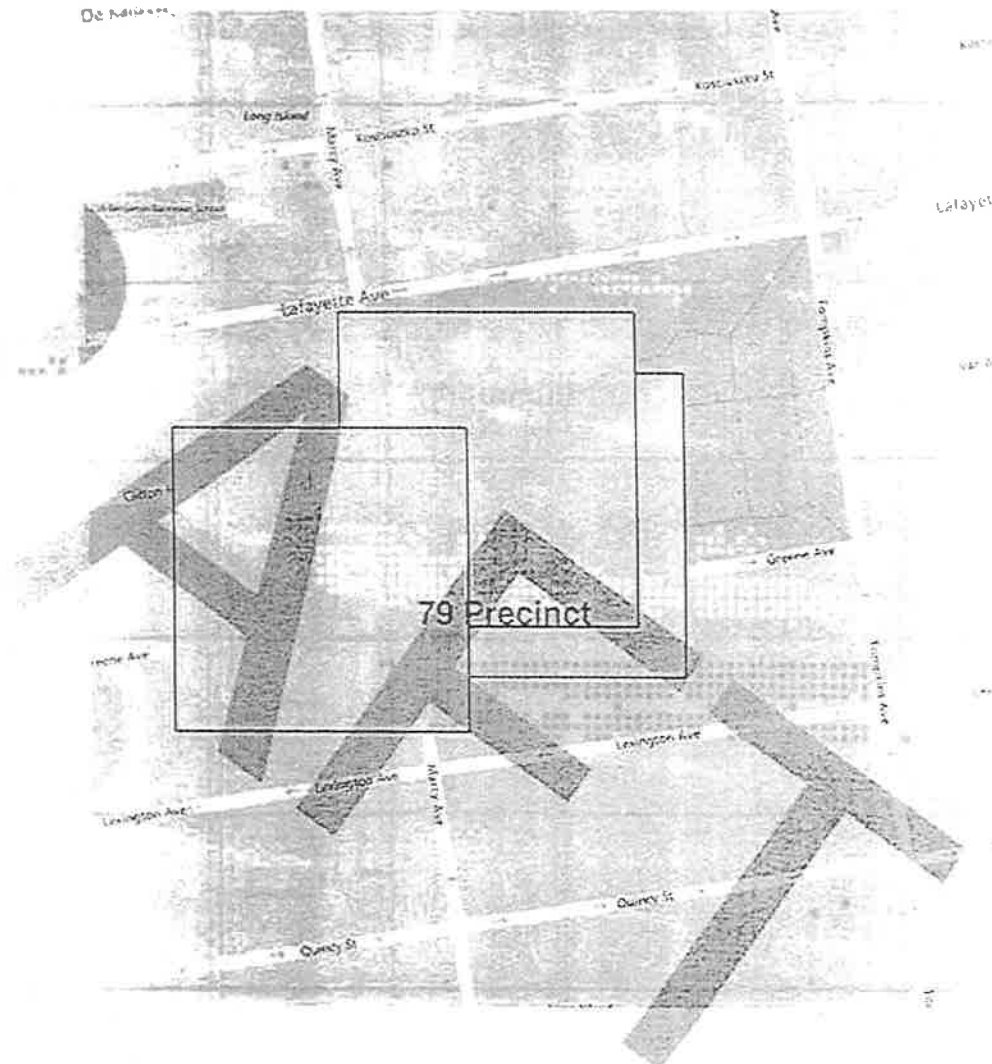
A typical vendor product might allow prediction boxes to move freely, as well as using 500' x 500' boxes, or even rectangles.

NYPD asked vendors to choose boxes on a fixed 300' x 300' grid, in order to compare vendors on an identical basis.



# Pilot Design: Box Count

A typical vendor product might provide differing numbers of boxes, depending on estimated risk for that period; crime type, and geography.

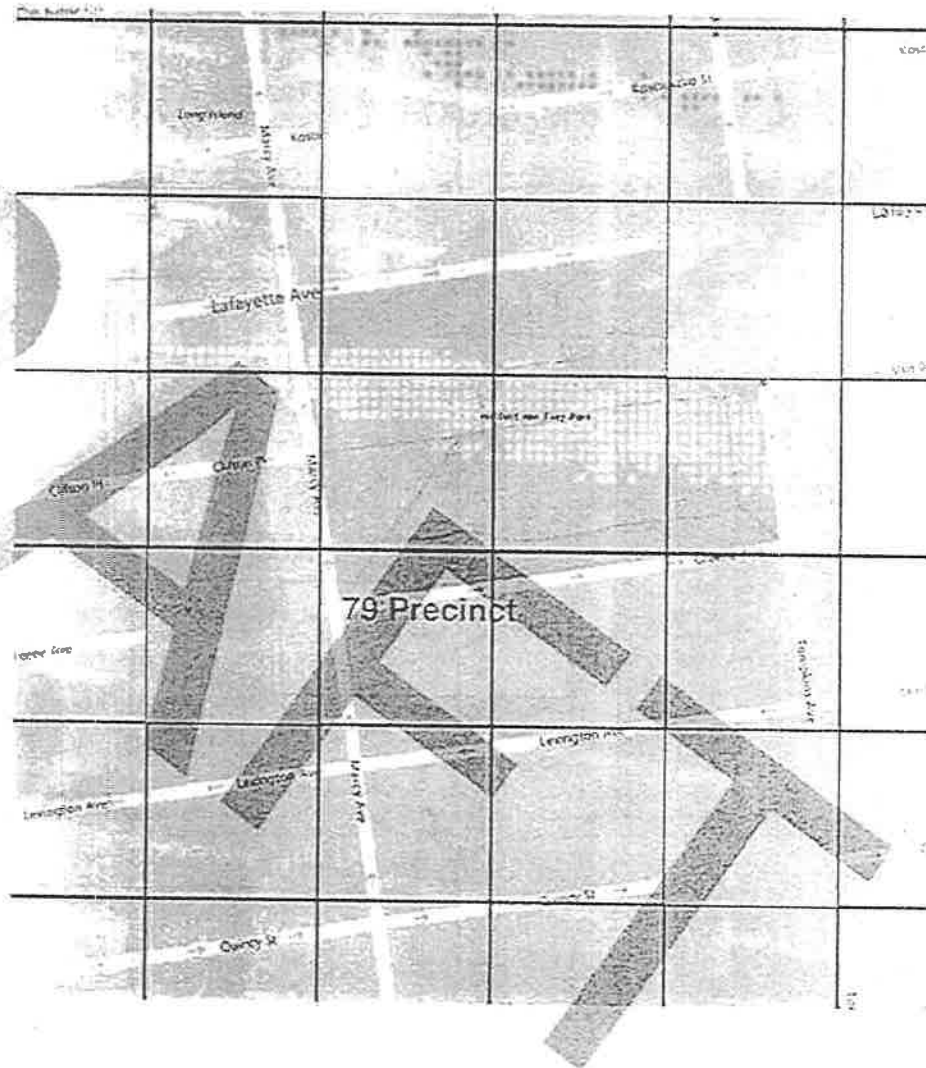




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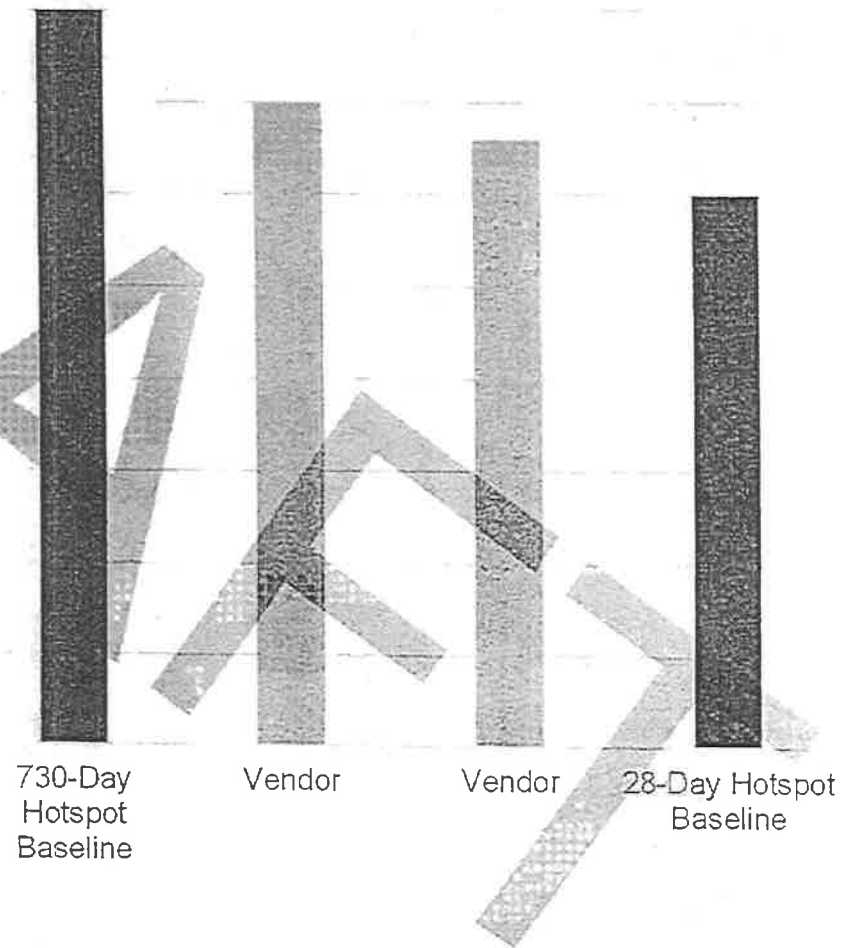
NYPD asked all vendors to provide five boxes per platoon, per crime type, per precinct, in order to compare vendors on an identical basis.



## Pilot Design: Baselines

NYPD used baselines of various lengths – not only the industry-standard 28-day hotspot, but also 365-day and 730-day hotspots.

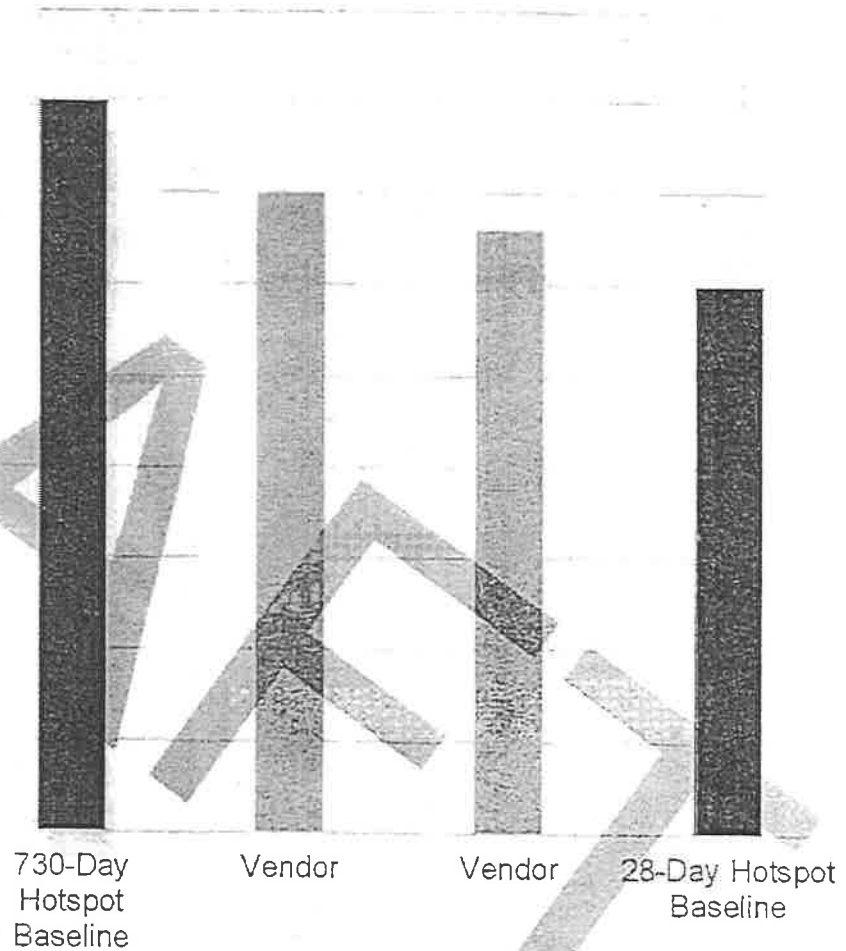
While two vendors regularly outdid the 28-day hotspot – consistent with published research – they did not outperform the longer 365-day and 730-day hotspots.



# Pilot Design: Utility

Vendor predictions may be more practical because they move around the precinct over time. Long-term hotspots may be less useful operationally, because they don't move much. However, the generally low performance of vendor models negates this advantage.

Other similar operational considerations were not evaluated as part of this pilot.



# Appendix: Additional Charts

# Results Summary

NYPD Predictive Policing Pilot

Table 1: Results of 2011 and 2012 Predictive Policing Pilot  
 Predictive Policing Program

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Crime Type	Relative <sup>1</sup>	Month 1		Month 2		Month 3		NYPD 7-day Hotspot		NYPD 35-day Hotspot		NYPD 130-day Hotspot		NYPD 254-day Hotspot		Random	
		C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N
All <sup>3</sup>	1.00	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100
Aggravated Assault	1.25	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125
Armed Robbery	1.50	1.50	150	1.50	150	1.50	150	1.50	150	1.50	150	1.50	150	1.50	150	1.50	150
Burglary	1.10	1.10	110	1.10	110	1.10	110	1.10	110	1.10	110	1.10	110	1.10	110	1.10	110
Domestic Violence	1.30	1.30	130	1.30	130	1.30	130	1.30	130	1.30	130	1.30	130	1.30	130	1.30	130
Drugs	1.40	1.40	140	1.40	140	1.40	140	1.40	140	1.40	140	1.40	140	1.40	140	1.40	140
Sexual Assault	1.20	1.20	120	1.20	120	1.20	120	1.20	120	1.20	120	1.20	120	1.20	120	1.20	120
Unlawful Possession of a Firearm	1.15	1.15	115	1.15	115	1.15	115	1.15	115	1.15	115	1.15	115	1.15	115	1.15	115
Domestic Violence - Severe	1.35	1.35	135	1.35	135	1.35	135	1.35	135	1.35	135	1.35	135	1.35	135	1.35	135
Domestic Violence - Minor	1.22	1.22	122	1.22	122	1.22	122	1.22	122	1.22	122	1.22	122	1.22	122	1.22	122

Table 2: Results of 2011 and 2012 Predictive Policing Pilot  
 Predictive Policing Program

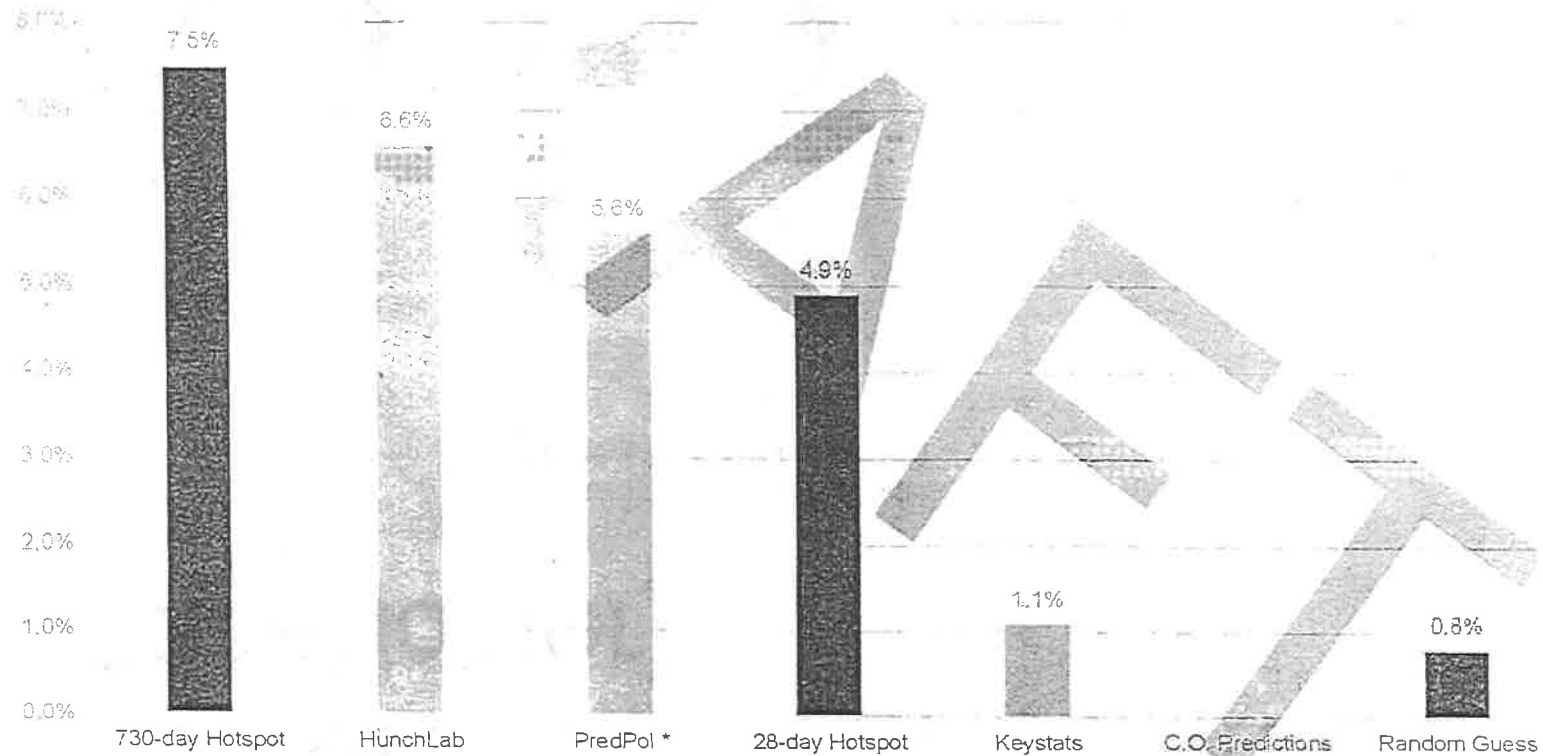
Crime Type	Relative <sup>1</sup>	Month 1		Month 2		Month 3		NYPD 7-day Hotspot		NYPD 35-day Hotspot		NYPD 130-day Hotspot		NYPD 254-day Hotspot		Random	
		C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N	C-w/F <sup>2</sup>	N
All <sup>3</sup>	1.00	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100	1.00	100
Aggravated Assault	1.25	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125	1.25	125
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<sup>1</sup> Relative: A measure of the relative frequency of a crime type in a hotspot area compared to the same area in a random area. A relative of 1.00 indicates that the frequency of a crime type in a hotspot area is the same as in a random area. A relative of 1.25 indicates that the frequency of a crime type in a hotspot area is 25% higher than in a random area. A relative of 0.75 indicates that the frequency of a crime type in a hotspot area is 25% lower than in a random area.

<sup>2</sup> C-w/F<sup>2</sup>: A measure of the relative frequency of a crime type in a hotspot area compared to the same area in a random area. A C-w/F<sup>2</sup> of 1.00 indicates that the frequency of a crime type in a hotspot area is the same as in a random area. A C-w/F<sup>2</sup> of 1.25 indicates that the frequency of a crime type in a hotspot area is 25% higher than in a random area. A C-w/F<sup>2</sup> of 0.75 indicates that the frequency of a crime type in a hotspot area is 25% lower than in a random area.

# Pilot Results: Robbery [Placeholder]

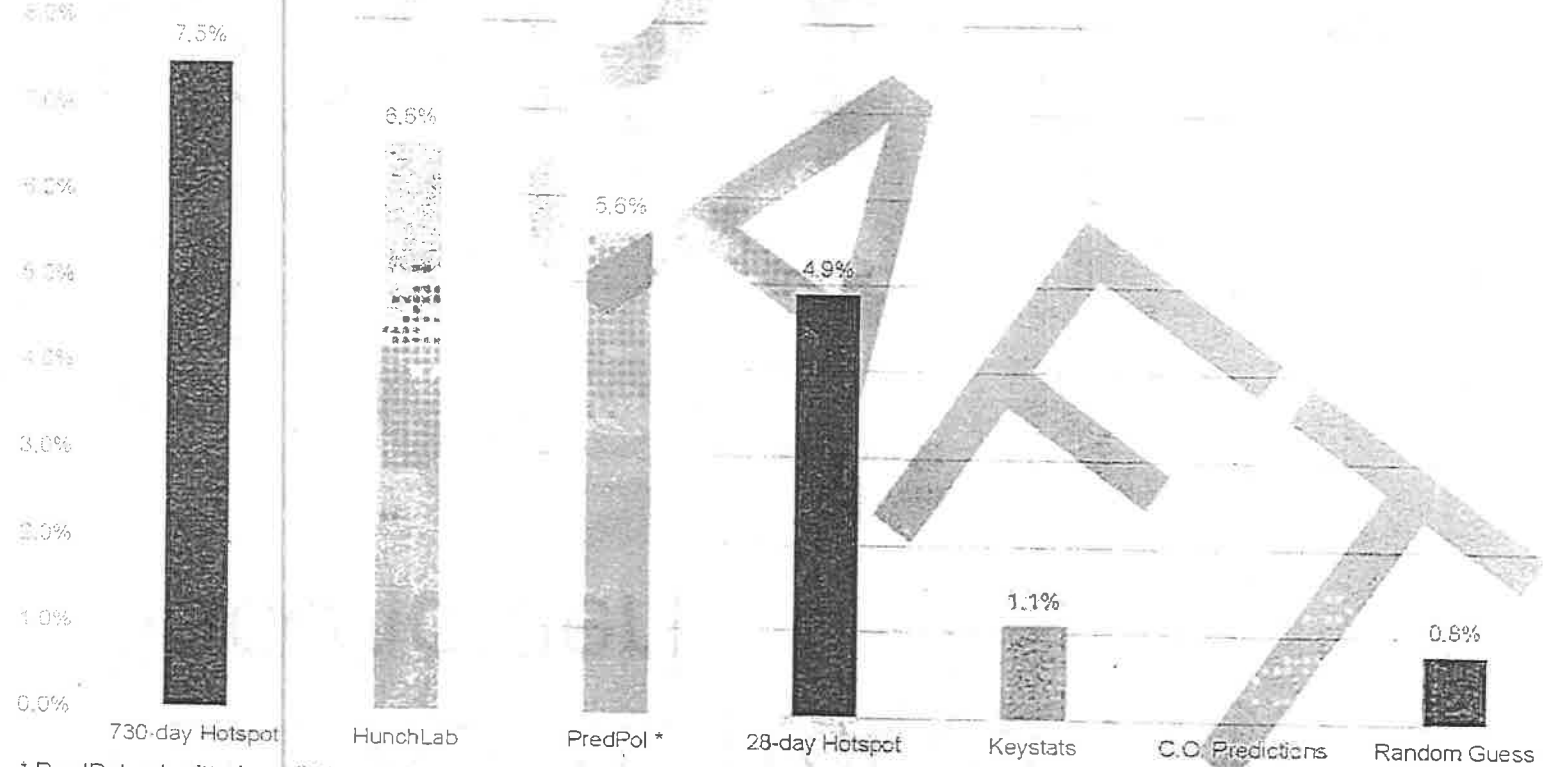
Percent of Composite Index Crimes  
Predicted by Boxes, April 28 – June 12



\* PredPol submitted predictions through the first platoon of 5/18 before withdrawing from the pilot.

# Pilot Results: Burglary etc etc [Placeholder]

Percent of Composite Index Crimes Predicted by Boxes, April 28 – June 12



\* PredPol submitted predictions through the first platoon of 5/18 before withdrawing from the pilot.

# Predicted Crime Categories (excluding shooting incidents)

PD_CD	PD_DESC	KY_CD	OFNS_DESC	PredictiveCategory
105	STRANGULATION 1ST	106	FELONY ASSAULT	Assault
106	ASSAULT 2,1 PEACE OFFICER	106	FELONY ASSAULT	Assault
109	ASSAULT 2,1,UNCLASSIFIED	106	FELONY ASSAULT	Assault
101	ASSAULT 3	344	ASSAULT 3 & RELATED OFFENSES	Assault
111	MENACING,PEACE OFFICER	344	ASSAULT 3 & RELATED OFFENSES	Assault
113	MENACING,UNCLASSIFIED	344	ASSAULT 3 & RELATED OFFENSES	Assault
114	OBSTR BREATH/CIRCUL	344	ASSAULT 3 & RELATED OFFENSES	Assault
211	BURGLARY,COMMERCIAL,DAY	107	BURGLARY	Burglary
213	BURGLARY,COMMERCIAL,NIGHT	107	BURGLARY	Burglary
214	BURGLARY,COMMERCIAL,UNKNOWN TI	107	BURGLARY	Burglary
221	BURGLARY,RESIDENCE,DAY	107	BURGLARY	Burglary
223	BURGLARY,RESIDENCE,NIGHT	107	BURGLARY	Burglary
224	BURGLARY,RESIDENCE,UNKNOWN TIM	107	BURGLARY	Burglary
231	BURGLARY,TRUCK DAY	107	BURGLARY	Burglary
233	BURGLARY,TRUCK NIGHT	107	BURGLARY	Burglary
234	BURGLARY,UNKNOWN TIME	107	BURGLARY	Burglary
241	BURGLARY,UNCLASSIFIED,DAY	107	BURGLARY	Burglary
243	BURGLARY,UNCLASSIFIED,NIGHT	107	BURGLARY	Burglary
244	BURGLARY,UNCLASSIFIED,UNKNOWN	107	BURGLARY	Burglary
109	BURGLARS TOOLS,UNCLASSIFIED	231	BURGLAR'S TOOLS	Burglary
421	LARCENY,GRAND FROM VEHICLE/MOTORCYCLE	109	GRAND LARCENY	Larceny from Auto
435	LARCENY,GRAND FROM TRUCK, UNATTENDED	109	GRAND LARCENY	Larceny from Auto
457	LARCENY,GRAND OF VEHICULAR/MOTORCYCLE ACCESSORIES	109	GRAND LARCENY	Larceny from Auto
267	MISCHIEF,CRIMINAL 3 & 2, OF M	121	CRIMINAL MISCHIEF & RELATED OF	Larceny from Auto
321	LARCENY,PETIT FROM AUTO	341	PETIT LARCENY	Larceny from Auto
349	LARCENY,PETIT OF LICENSE PLATE	341	PETIT LARCENY	Larceny from Auto
257	LARCENY,PETIT OF VEHICLE ACCES	341	PETIT LARCENY	Larceny from Auto
254	MISCHIEF,CRIMINAL 4, OF MOTOR	351	CRIMINAL MISCHIEF & RELATED OF	Larceny from Auto

Continued on next page



PD_CD	PD_DESC	KY_CD	QFNS_DESC	PredictiveCategory
404	LARCENY, GRAND FROM PERSON, PERSONAL ELECTRONIC DEVICE(SNATCH)	109	GRAND LARCENY	Grand Larceny Person
406	LARCENY, GRAND FROM PERSON, BAG OPEN/DIP	109	GRAND LARCENY	Grand Larceny Person
407	LARCENY, GRAND BY DISHONEST EMP	109	GRAND LARCENY	Grand Larceny Person
408	LARCENY, GRAND FROM PERSON, LUSH WORKER(SLEEPING/UNCON VICTIM)	109	GRAND LARCENY	Grand Larceny Person
414	LARCENY, GRAND FROM PERSON, NECK CHAI	109	GRAND LARCENY	Grand Larceny Person
415	LARCENY, GRAND FROM PERSON, PICK	109	GRAND LARCENY	Grand Larceny Person
417	LARCENY, GRAND FROM PERSON, PURS	109	GRAND LARCENY	Grand Larceny Person
419	LARCENY, GRAND FROM PERSON, UNCL	109	GRAND LARCENY	Grand Larceny Person
360	ROBBERY, ATM LOCATION	105	ROBBERY	Robbery
361	ROBBERY, BANK	105	ROBBERY	Robbery
363	ROBBERY, BAR/RESTAURANT	105	ROBBERY	Robbery
365	ROBBERY, LIQUOR STORE	105	ROBBERY	Robbery
366	ROBBERY, BICYCLE	105	ROBBERY	Robbery
367	ROBBERY, CHAIN STORE	105	ROBBERY	Robbery
371	ROBBERY, CHECK CASHING BUSINESS	105	ROBBERY	Robbery
373	ROBBERY, DOCTOR/DENTIST OFFICE	105	ROBBERY	Robbery
375	ROBBERY, PHARMACY	105	ROBBERY	Robbery
377	ROBBERY, BODEGA/CONVENIENCE STORE	105	ROBBERY	Robbery
379	ROBBERY, GAS STATION	105	ROBBERY	Robbery
380	ROBBERY, CAR JACKING	105	ROBBERY	Robbery
381	ROBBERY, HIJACKING	105	ROBBERY	Robbery
382	ROBBERY, NECKCHAIN/JEWELRY	105	ROBBERY	Robbery
384	ROBBERY, POCKETBOOK/CARRIED BAG	105	ROBBERY	Robbery
385	ROBBERY, PAYROLL	105	ROBBERY	Robbery
386	ROBBERY, PERSONAL ELECTRONIC DEVICE	105	ROBBERY	Robbery
388	ROBBERY, RESIDENTIAL COMMON AREA	105	ROBBERY	Robbery
389	ROBBERY, DWELLING	105	ROBBERY	Robbery
390	ROBBERY, HOME INVASION	105	ROBBERY	Robbery
391	ROBBERY, LICENSED MEDALLION CAB	105	ROBBERY	Robbery
392	ROBBERY, UNLICENSED FOR HIRE VEHICLE	105	ROBBERY	Robbery
393	ROBBERY, OF TRUCK DRIVER	105	ROBBERY	Robbery
395	ROBBERY, ON BUS/ OR BUS DRIVER	105	ROBBERY	Robbery
397	ROBBERY, OPEN AREA UNCLASSIFIED	105	ROBBERY	Robbery
398	ROBBERY, PUBLIC PLACE INSIDE	105	ROBBERY	Robbery
399	ROBBERY, COMMERCIAL UNCLASSIFIED	105	ROBBERY	Robbery
383	ROBBERY, DELIVERY PERSON	105	ROBBERY	Robbery
387	ROBBERY, CLOTHING	105	ROBBERY	Robbery
394	ROBBERY, LICENSED FOR HIRE VEHICLE	105	ROBBERY	Robbery
396	ROBBERY, BEGIN AS SHOPLIFTING	105	ROBBERY	Robbery

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