

A Geographic Approach to Racial Profiling: Does the Location Explain Racial Disparity in Traffic Stops?

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What is racial profiling?

- Racial profiling occurs when “a person is treated as a suspect because of his or her race, ethnicity, nationality or religion” - *American Civil Liberties Union*
- *Whren v. United States* (1996): The U.S. Supreme Court held that it is not unconstitutional for the police to use a traffic violation as a pretext for investigating criminal behaviors.
- Are minorities more likely than whites:
 - To be stopped?
 - To be stopped for an investigatory purpose?
 - To be searched?
 - To be charged?
 - To be arrested?

What have we found so far?

■ The New Jersey Turnpike Study (1996)

- Blacks: 14% road users vs. 73% stops

■ The NYPD Pedestrian Study (1999)

- Black: 26% population vs. 51% stops

■ The Massachusetts Study (2004)

- Searches: W : NW = 1.3% : 18%
- Citations: W : NW = 66% : 72%

■ The Illinois Traffic Stop Study (2006)

- Moving violations: W : NW = 73% : 68%
- Non-moving violations: W : NW = 27% : 32%
- Consent searches: blacks were 3.3 times more than whites

■ The Rhode Island Traffic Stop Report (2006)

- Searches: Non-whites are twice more than whites.

Do places matter?

- Are crimes spatially concentrated?
- Are police forces spatially concentrated?
- Hypotheses
 - Minority drivers are more frequently stopped than white drivers because they are stopped in minority areas where more police force are put into.
 - Minority drivers are differently treated from white drivers because they are stopped in minority areas where the police apply different policing strategies.

Data

- Houston Police Department Traffic Stop Data
 - 344,888 traffic stops, 2003 in 121 beats of HPD
- U.S. Census data 2000
- HPD deployment data
 - All patrol assignments in each of 121 beats in 2003

Variables

- Police stop variables
 - Number of stops
 - Stop risk: Observed stops/Expected stops
- Police treatment variables
 - Stop reason: Moving traffic, Non-moving traffic, Investigation
 - Disposition: Release, Ticket, Arrest
 - Search: Consent search, Probable cause search, No search
 - Charge: Traffic, Misdemeanor, Felony, No charge
- Geographic variables
 - Rate of blacks
 - Rate of Hispanics
 - Deployment density: The number of police-initiated deployment in each beat over the total number of shifts for one year ($3\text{shifts} \times 365 = 1,095$)
- Racial disparity variables
 - Rate of investigatory stops
 - Rate of arrests
 - Rate of consent searches
 - Rate of probable cause searches
 - Rate of felony charges
 - Releases / Investigatory stops
 - Searches / Non-moving traffic offense stops
 - Searches / Moving traffic offense stops
 - Contraband found / Searches: “hit rate”

<i>Variables</i>	<i>N</i>	<i>%</i>
Race		
White	91720	26.6
Black	131394	38.1
Hispanic	110643	32.1
Others	11128	3.2
Stop Reasons		
Non-Moving Traffic	41111	11.9
Moving Traffic	115187	33.4
Investigation	188587	54.7
Disposition		
Released	194660	56.4
Ticketed	88819	25.8
Arrested	61406	17.8
Search		
No Search	289412	83.9
Consent Search	10526	3.1
Probable Cause Search	44947	13.0
Contraband		
Yes	5015	1.5
No	339870	98.5
Charge		
No Charges	194660	56.4
Traffic	90837	26.3
Misdemeanor	49044	14.2
Felony	10344	3.0
Total	344885	100

Variable Description

Variable Description of Regression Model

	<i>N</i>	<i>MIN</i>	<i>MAX</i>	<i>Mean</i>	<i>S.D.</i>
Investigatory Stop Rates	106	.15	.85	.54	.17
Arrest Rates	106	.03	.33	.18	.07
Consent Search Rates	106	.00	.10	.03	.02
Probable Cause Search Rates	106	.02	.27	.13	.06
Felony Rates	106	.00	.10	.03	.02
Release/Investigatory Stop Rates	106	.38	.90	.65	.11
Search/Non-Moving Stop Rates	106	.00	.14	.02	.02
Search/Moving Rates	106	.00	.14	.02	.02
Contraband/Search Rates	106	.00	.38	.08	.05
Black Rates	106	.01	.92	.26	.26
Hispanic Rates	106	.05	.92	.35	.24
Deployment Density	106	.00	4.49	1.13	.79
Population	106	1205	57992	22172.31	11937.19

<i>Stop Reasons</i>		<i>Observed</i>	<i>Expected</i>	<i>Residual</i>
Non-moving traffic	White	22.6% (9280)	31.2% (12827)	-8.6% (-3547)
	Black	38.6% (15891)	24.8% (10196)	13.8% (5695)
	Hispanic	36.5% (15000)	36.7% (15088)	-0.2% (-88)
	Others	0.2% (941)	7.3% (3001)	-7.1% (-2060)
	Total	41112		
χ^2				5576.8**
Moving traffic	White	32.4% (37275)	31.2% (35939)	1.2% (1336)
	Black	32.0% (36878)	24.8% (28567)	7.2% (8311)
	Hispanic	31.9% (36701)	36.7% (42274)	-4.8% (-5573)
	Others	3.8% (4334)	7.3% (8409)	-3.5% (-4075)
	Total	115188		
χ^2				5177.1**
Investigation	White	23.9% (45165)	31.2% (58839)	-7.3% (-13674)
	Black	41.7% (78626)	24.8% (46770)	16.9% (31856)
	Hispanic	31.2% (58944)	36.7% (69212)	-5.5% (-10268)
	Others	3.1% (5853)	7.3% (13767)	4.2% (-7914)
	Total	188588		
χ^2				30948.7**

Racial Differences in the Number of Stops by Stop Reasons

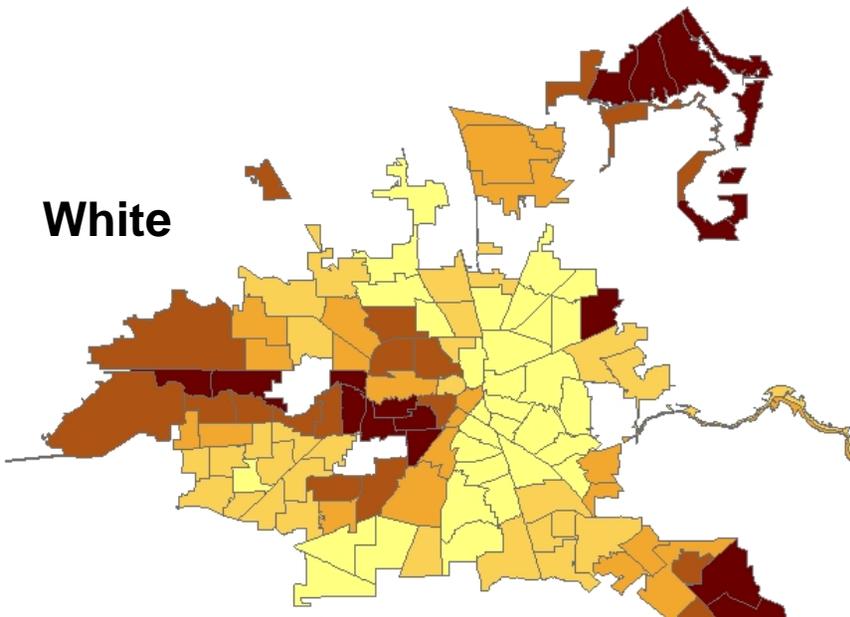
* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed)

<i>Police Treatments</i>	<i>White</i>	<i>Black</i>	<i>Hispanic</i>	<i>Others</i>
Disposition				
Released	61.1% (56023)	58.3% (76663)	49.3% (54569)	66.5% (7405)
Ticketed	25.8% (23677)	21.9% (28790)	30.4% (33590)	24.8% (2762)
Arrested	13.1% (12020)	19.7% (25941)	20.3% (22484)	8.6% (961)
				5631.9**
Search				
No Search	89.4% (82029)	80.7% (106078)	82.2% (90939)	93.2% (10366)
Consent Search	2.1% (1917)	3.9% (5177)	3.0% (3268)	1.5% (164)
PC Search	8.5% (7774)	15.3% (20139)	14.9% (16436)	5.4% (598)
				4130.8**
Contraband				
No	99.0% (90837)	97.8% (128541)	98.9% (109419)	99.5% (11073)
Yes	1.0% (883)	2.2% (2853)	1.1% (1224)	0.5% (55)
				791.2**
Charge				
No Charges	61.1% (56023)	58.3% (76663)	49.3% (54569)	66.5% (7405)
Traffic	25.5% (23365)	22.6% (29659)	31.7% (35126)	24.1% (2687)
Misdemeanor	11.6% (10678)	14.5% (19000)	16.7% (18440)	8.3% (926)
Felony	1.8% (1654)	4.6% (6072)	2.3% (2508)	1.0% (110)
				6722.0**

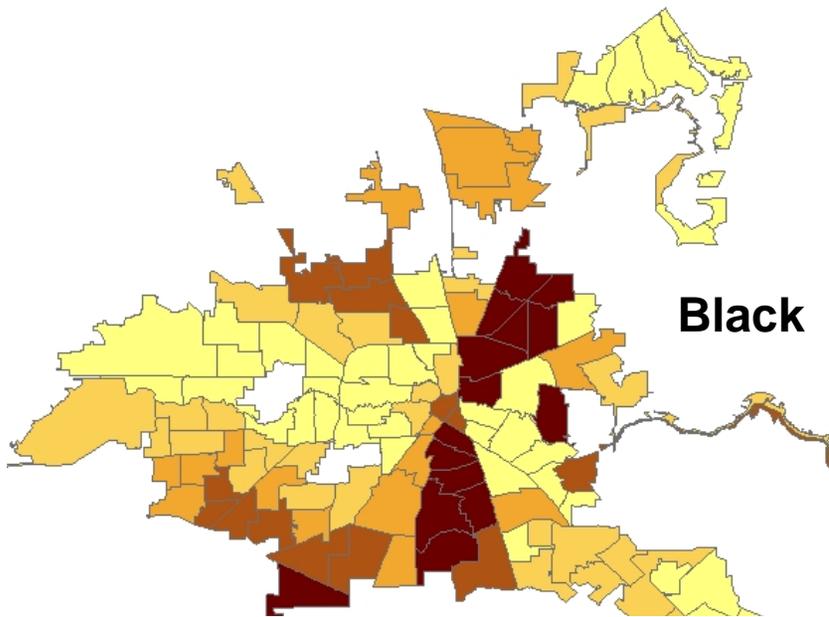
Racial Differences
in Police Treatments

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed)

White

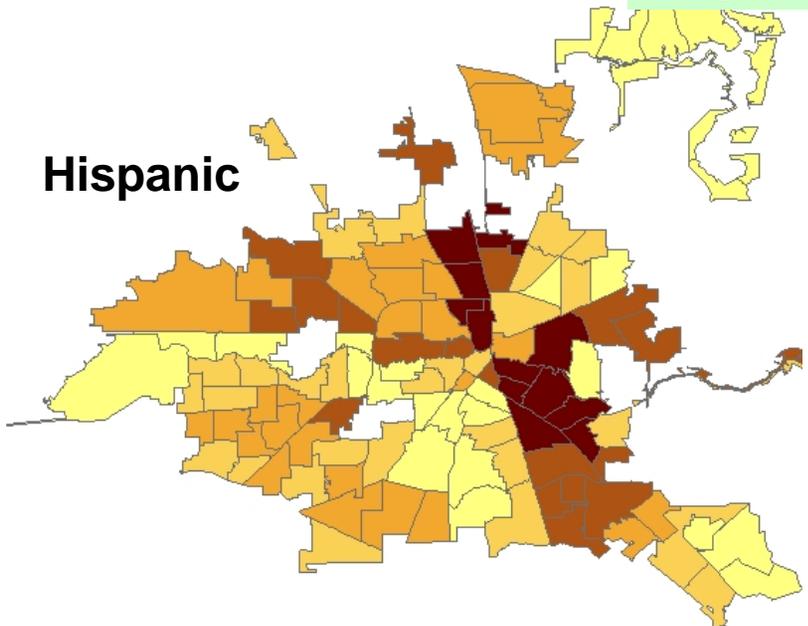


Black

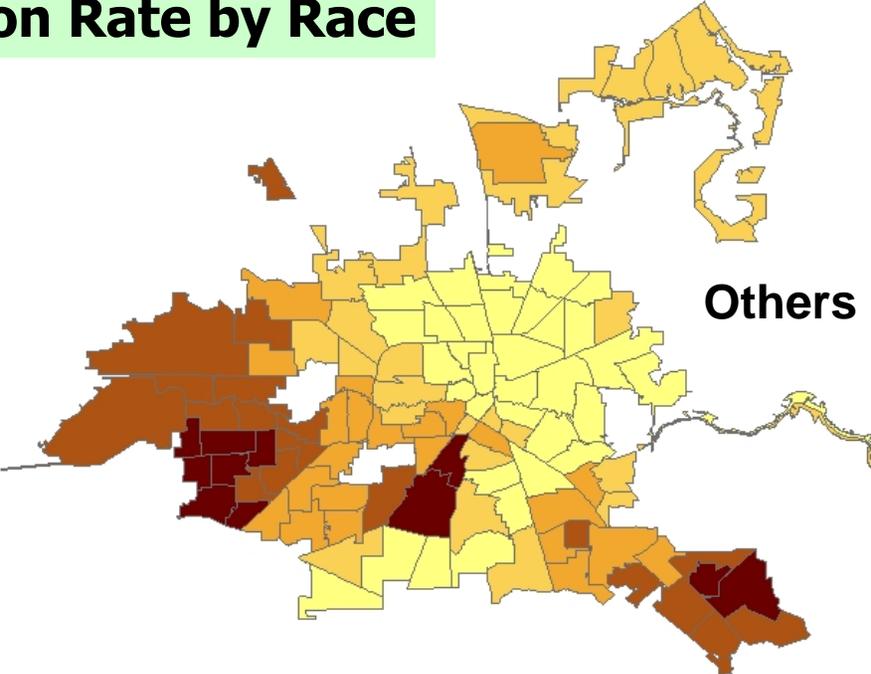


Population Rate by Race

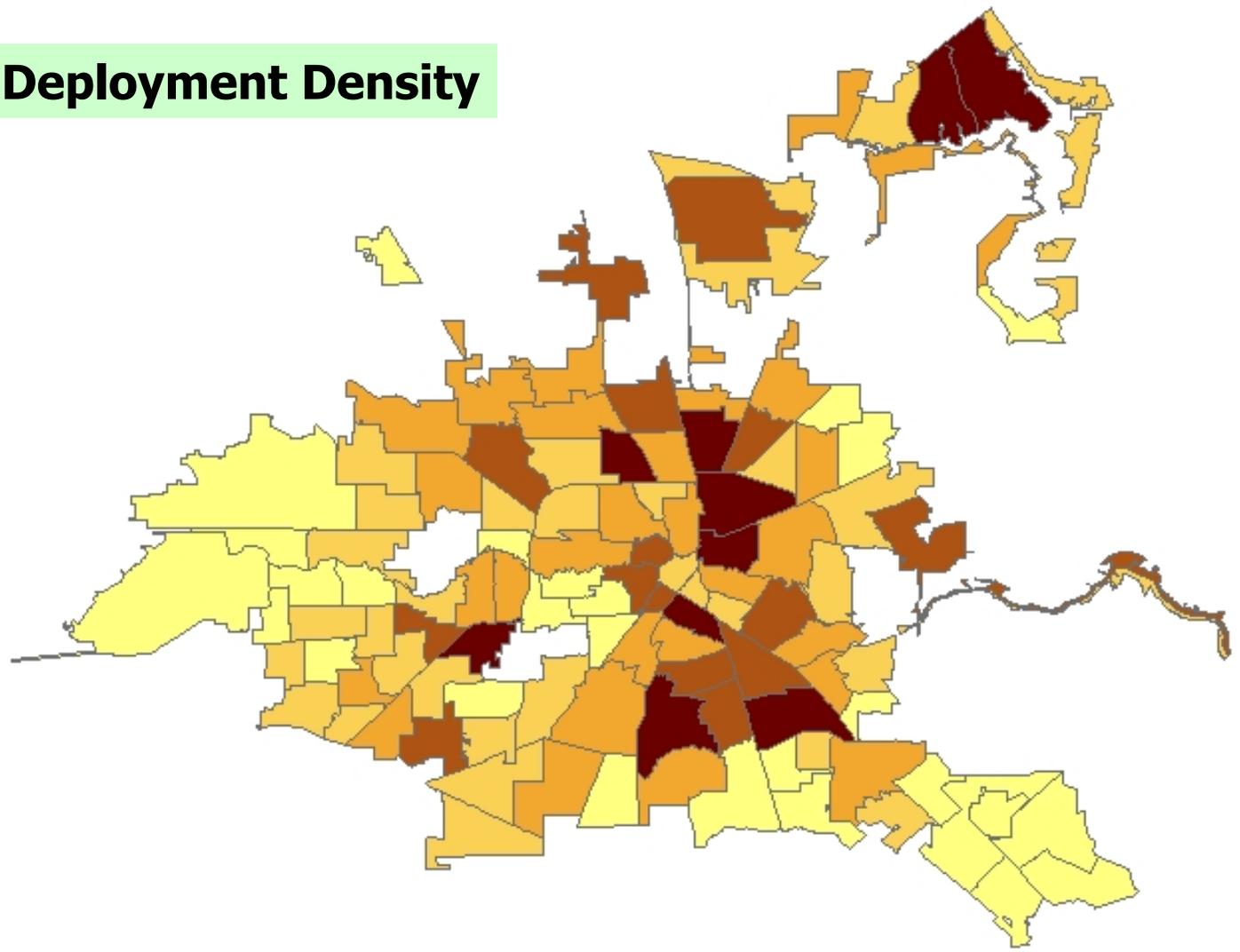
Hispanic



Others



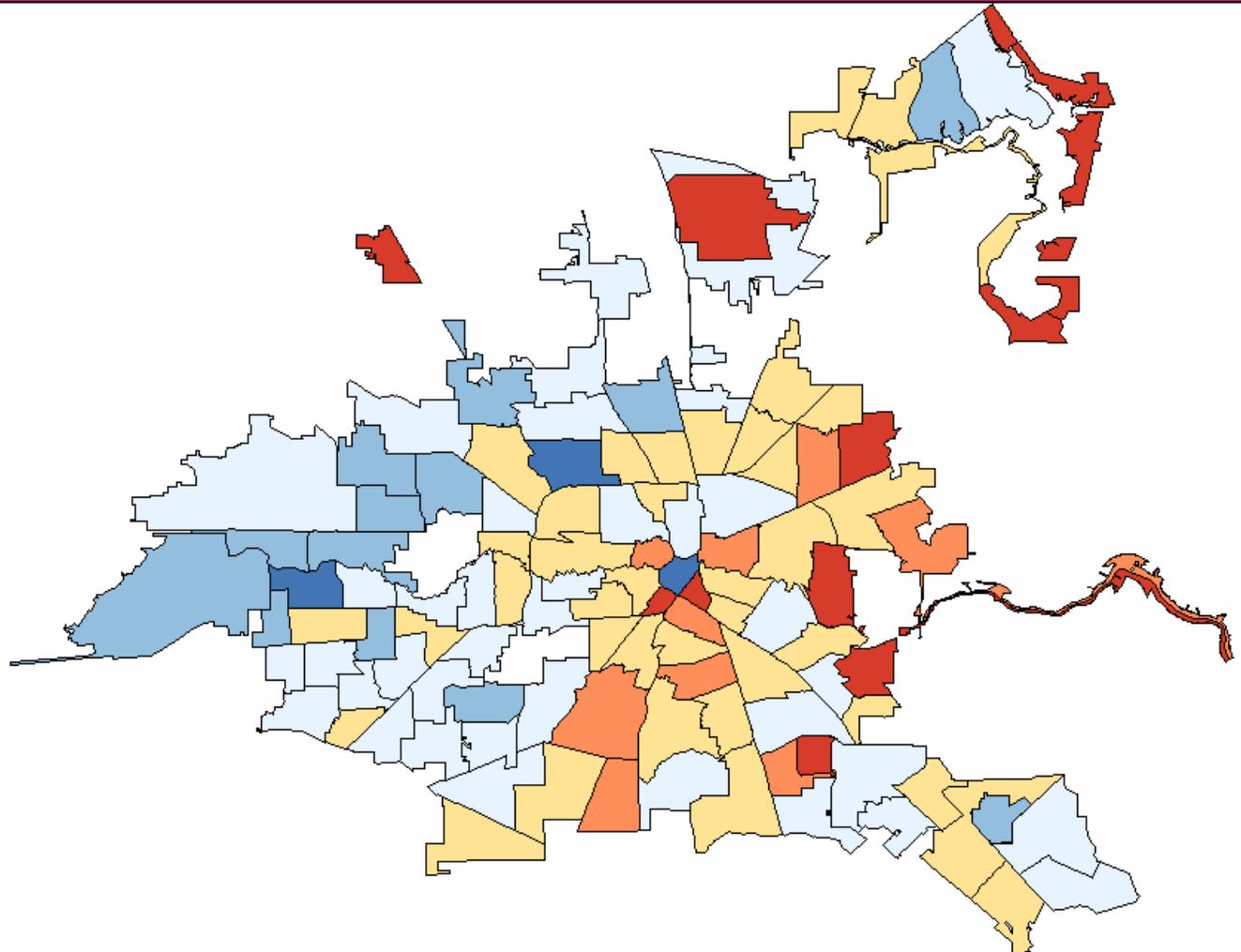
Deployment Density



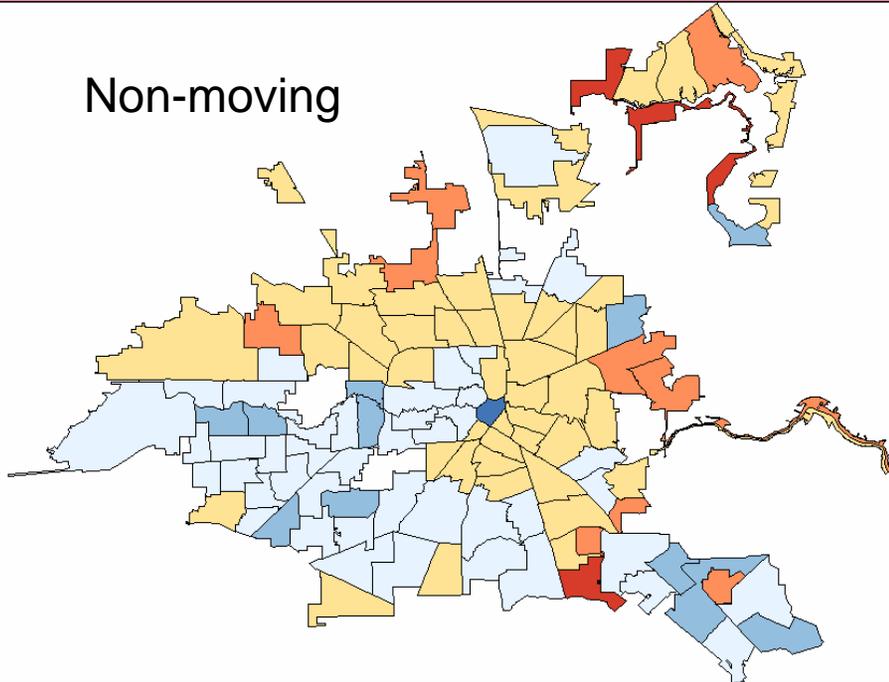
Excess Risk Map of Traffic Stop

Excess Risk Map: STP_TOTAL over POP_TOTAL

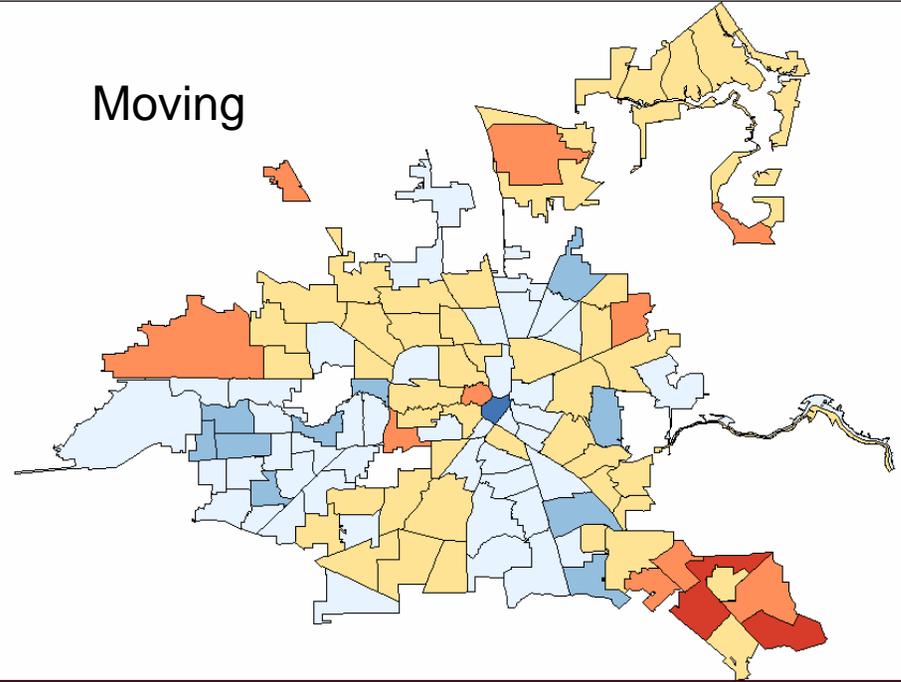
- < 0.25 (3)
- 0.25 - 0.50 (13)
- 0.50 - 1.00 (38)
- 1.00 - 2.00 (38)
- 2.00 - 4.00 (9)
- > 4.00 (9)



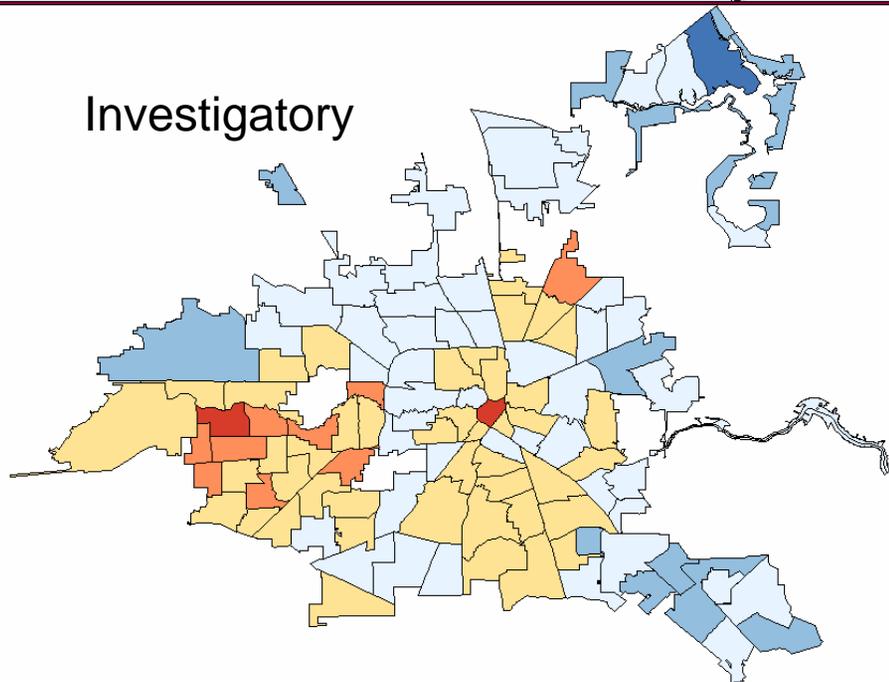
Non-moving



Moving

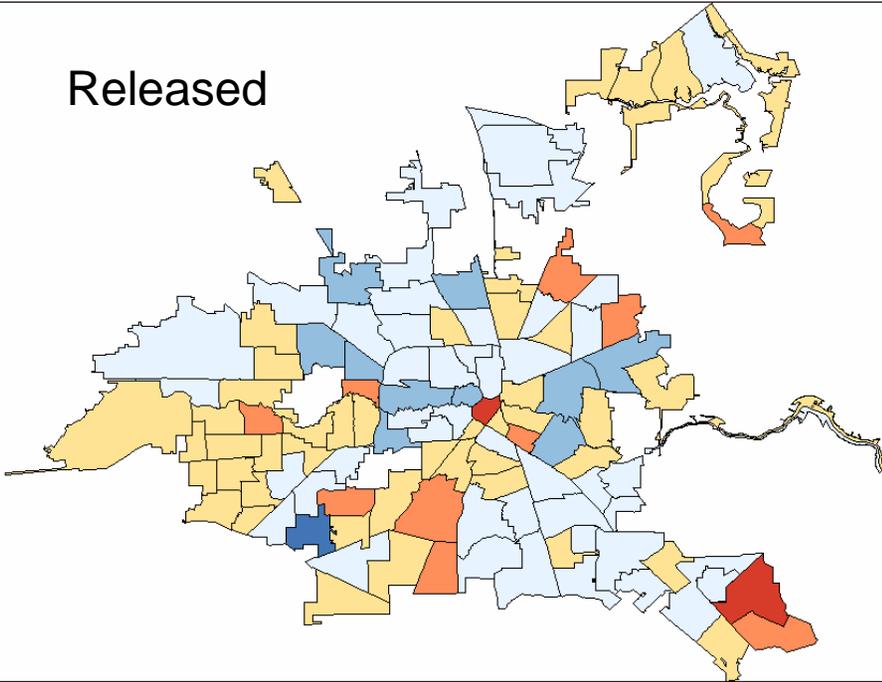


Investigatory

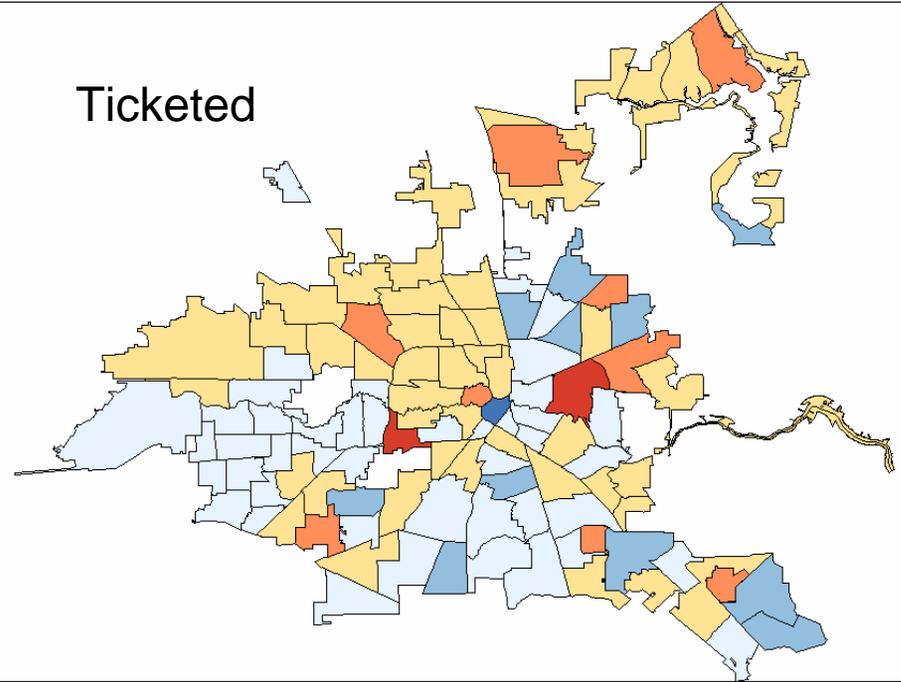


Percentile Map: Stop Reason

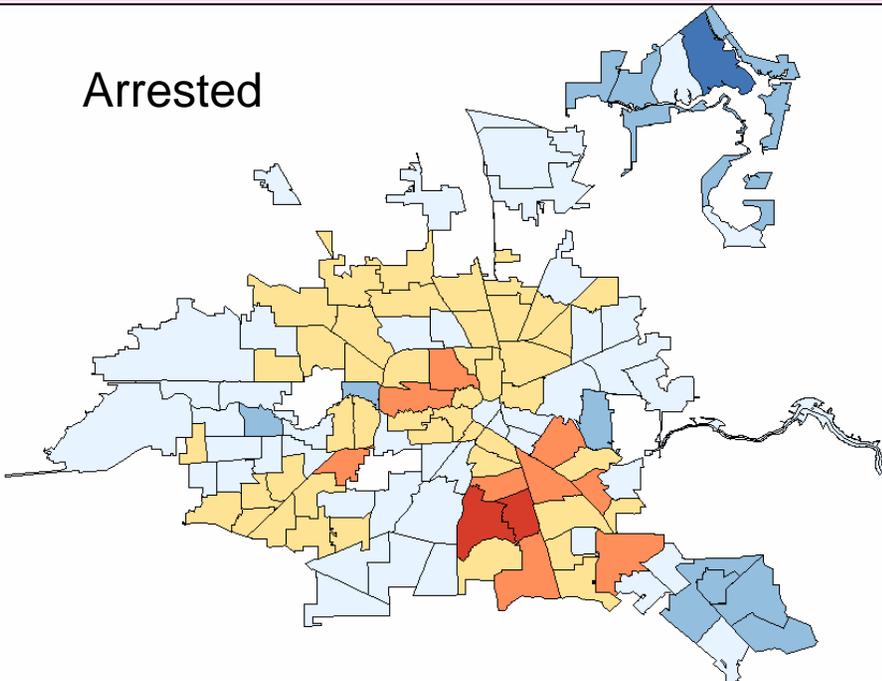
Released



Ticketed

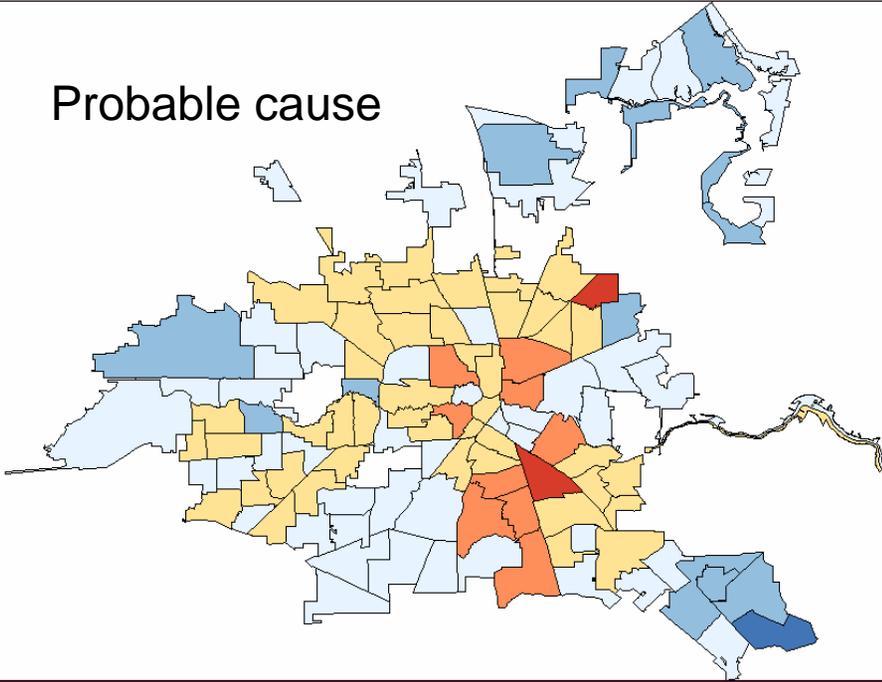


Arrested

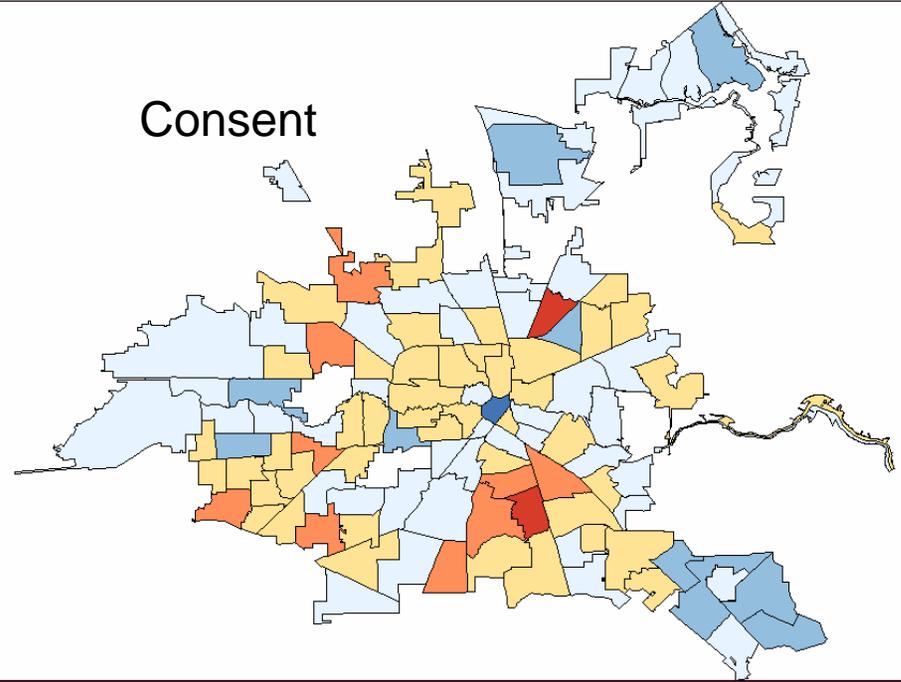


Percentile Map: Disposition

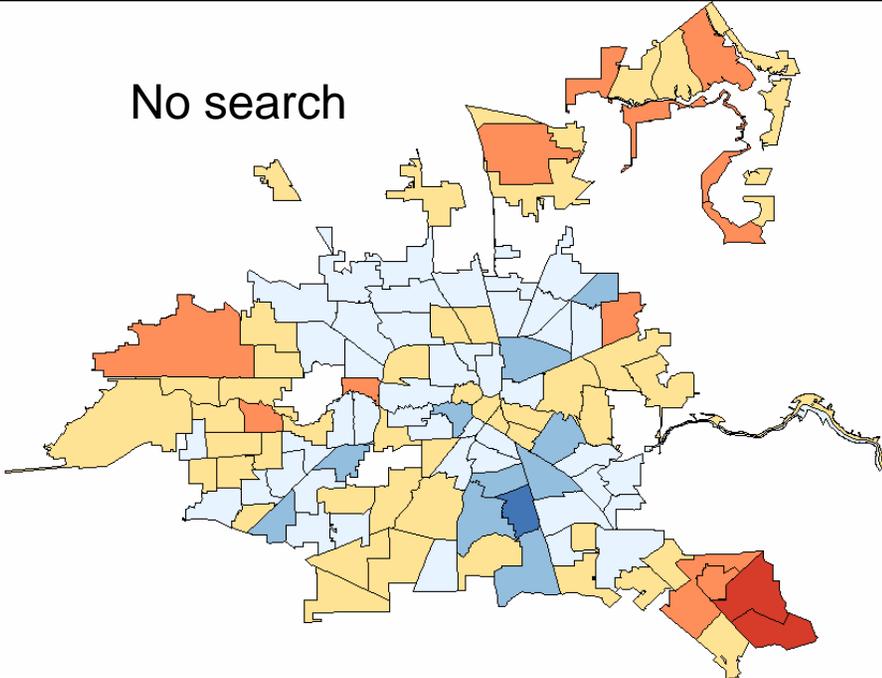
Probable cause



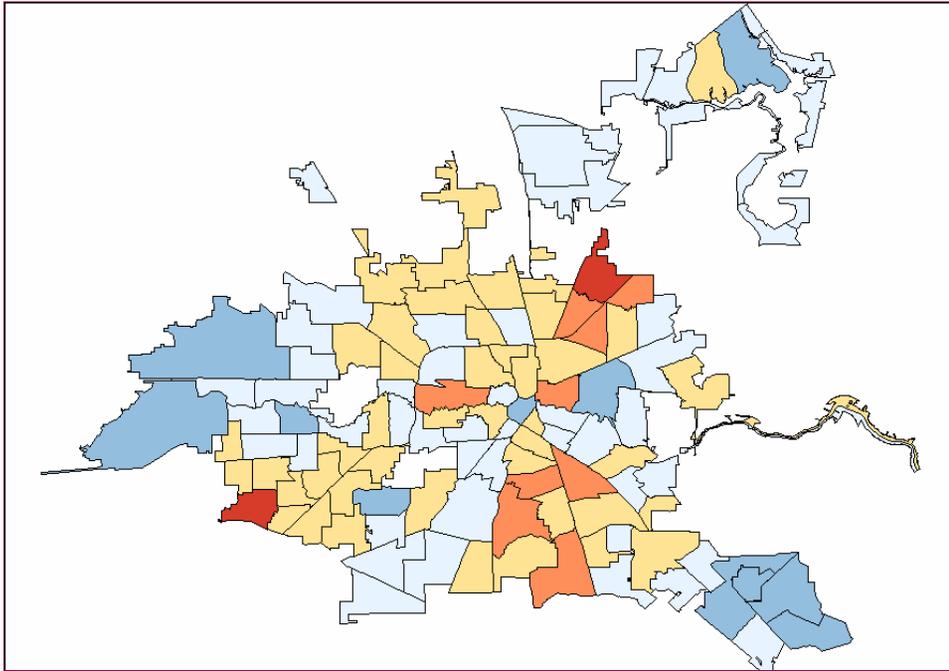
Consent



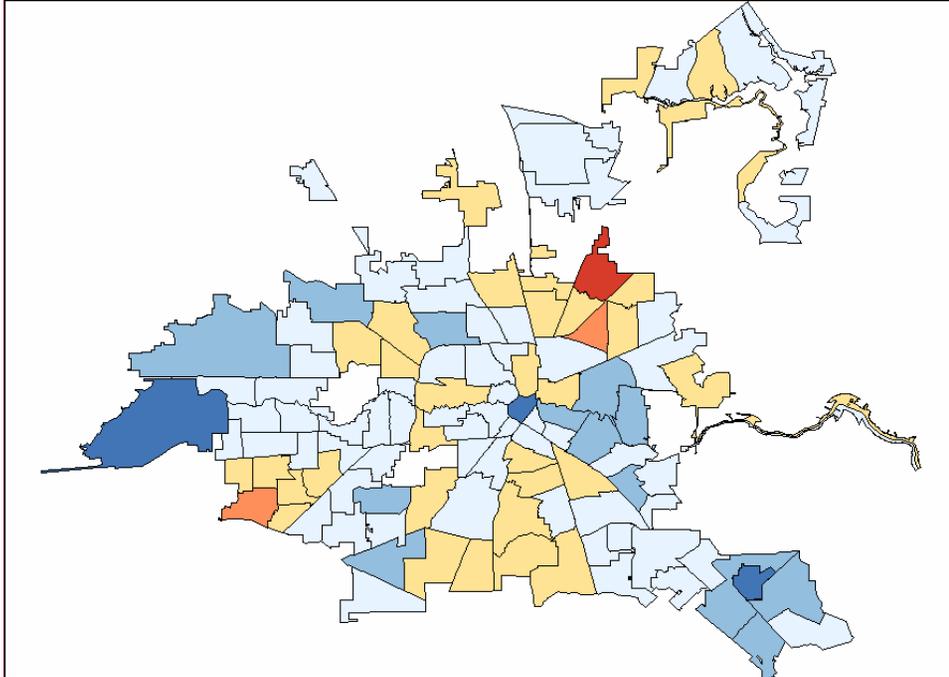
No search



Percentile Map: Search

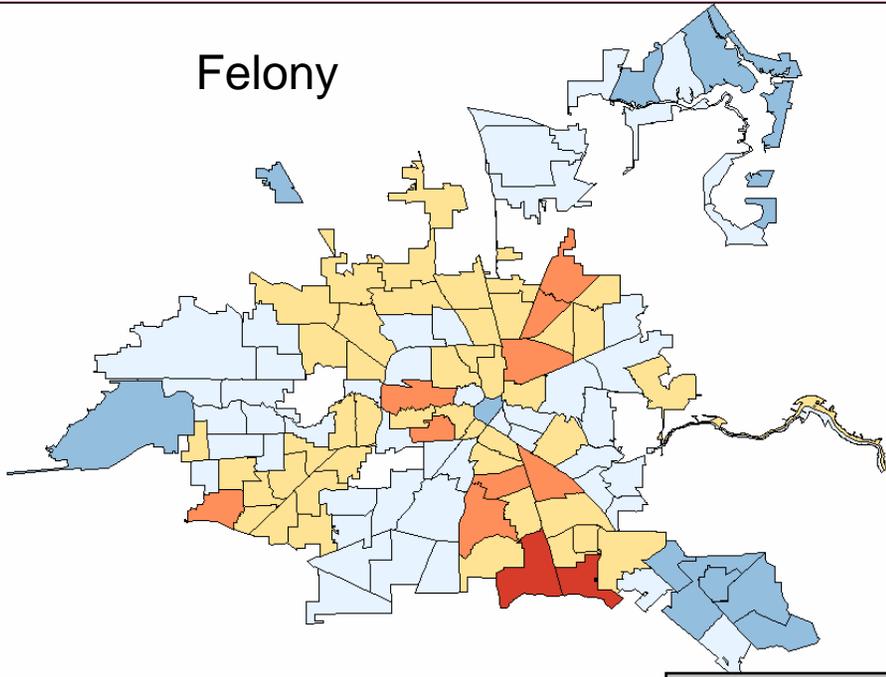


**Percentile Map:
Contraband Found**

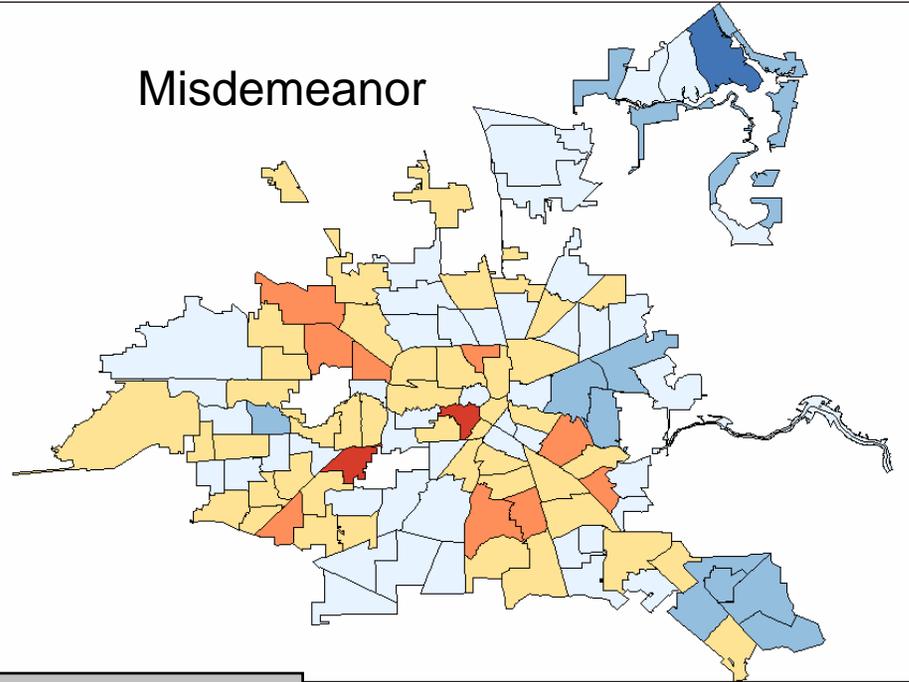


**Excess Risk Map:
Contraband Found**

Felony

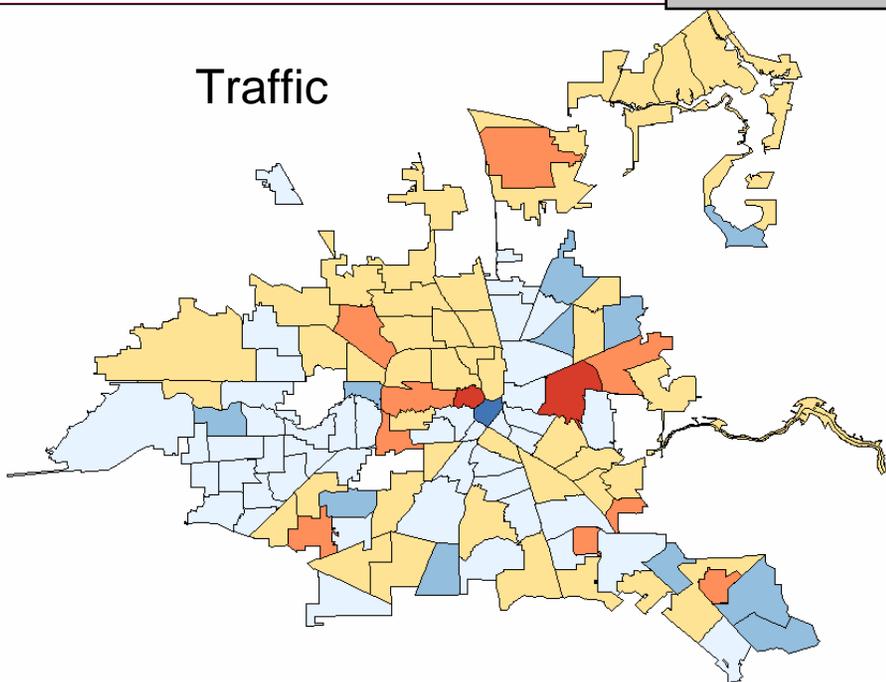


Misdemeanor

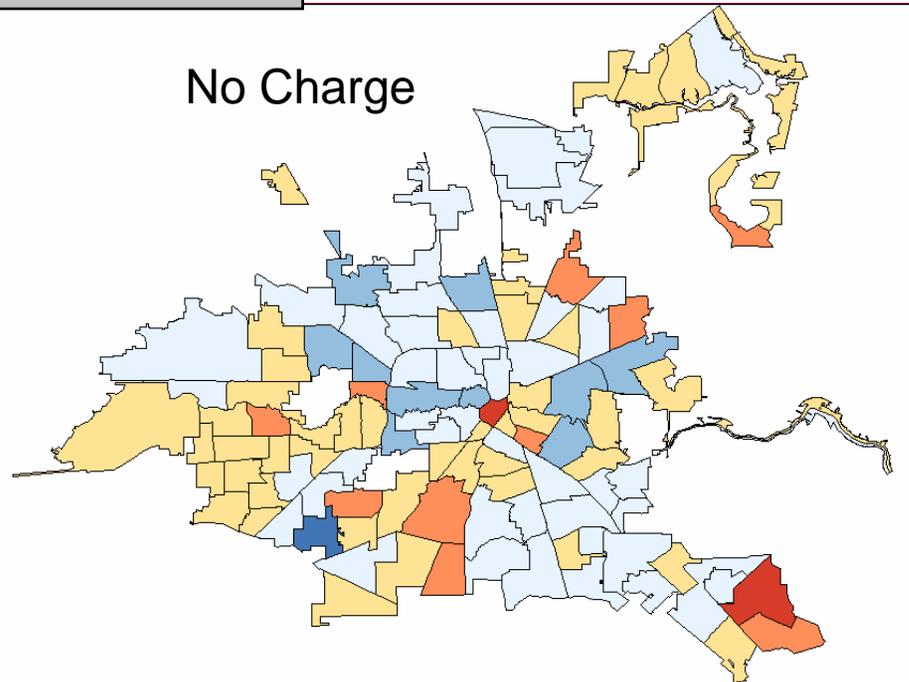


Percentile Map: Charge

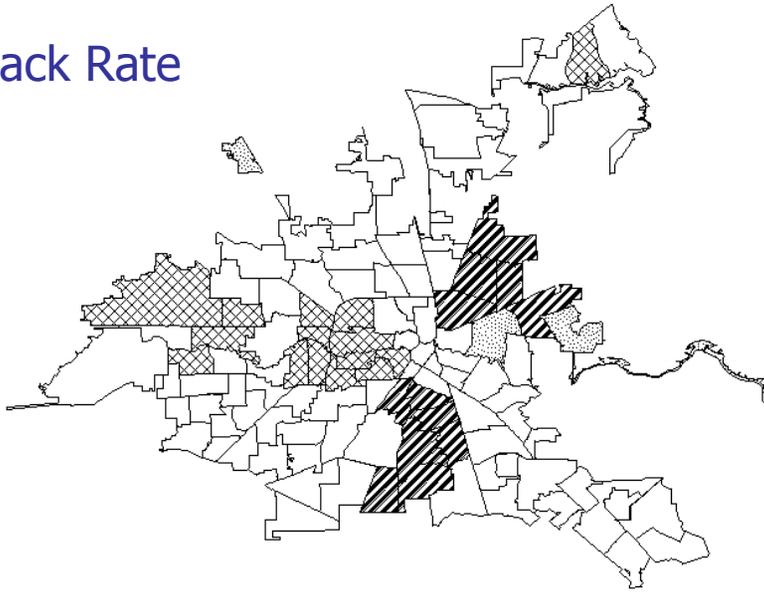
Traffic



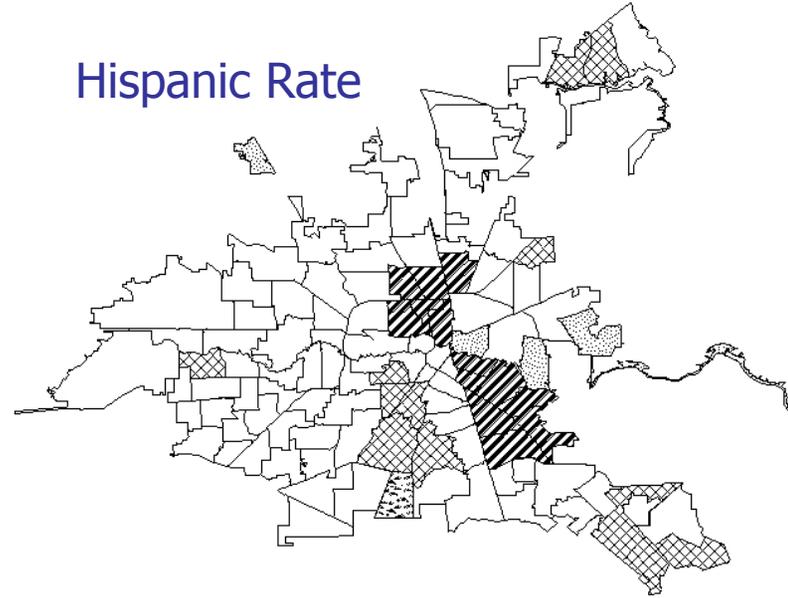
No Charge



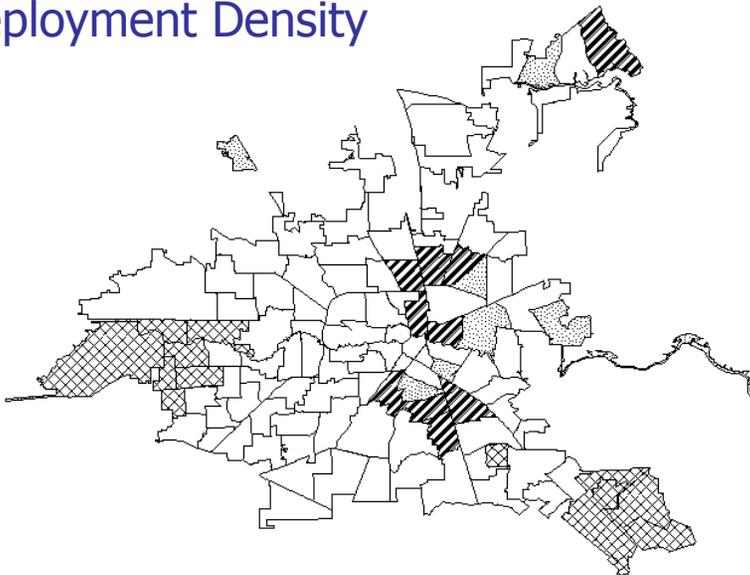
Black Rate



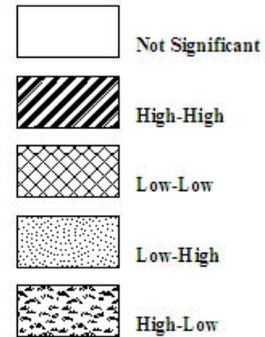
Hispanic Rate



Deployment Density

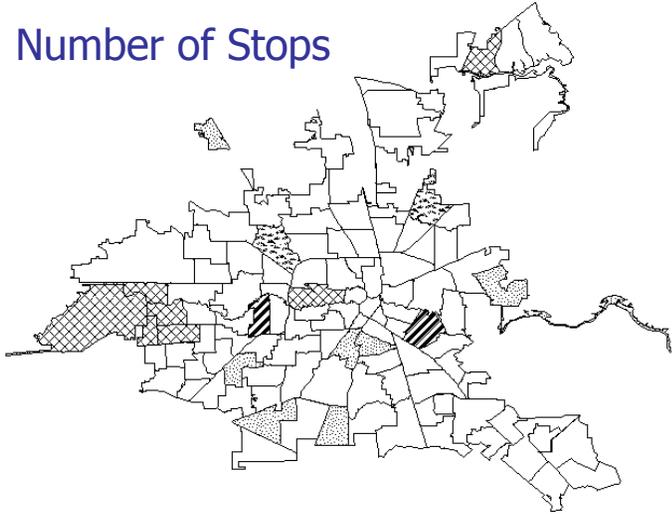


LISA Cluster Map

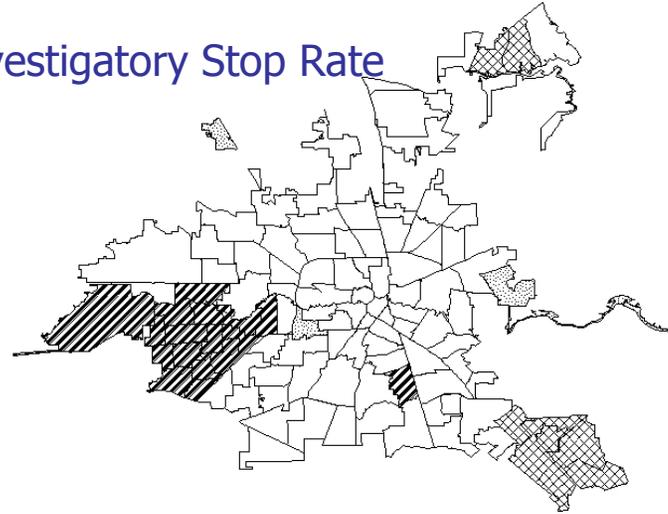


LISA Cluster Maps of Beat Characteristics

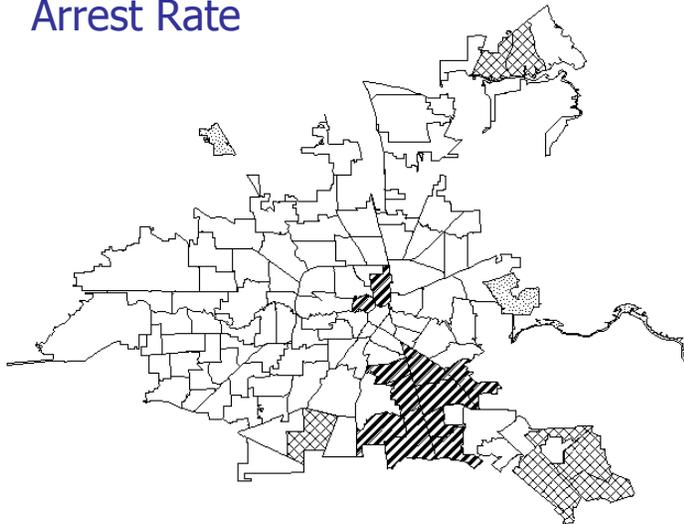
Number of Stops



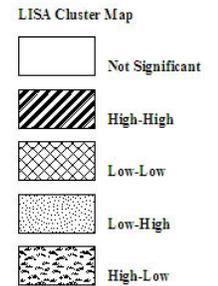
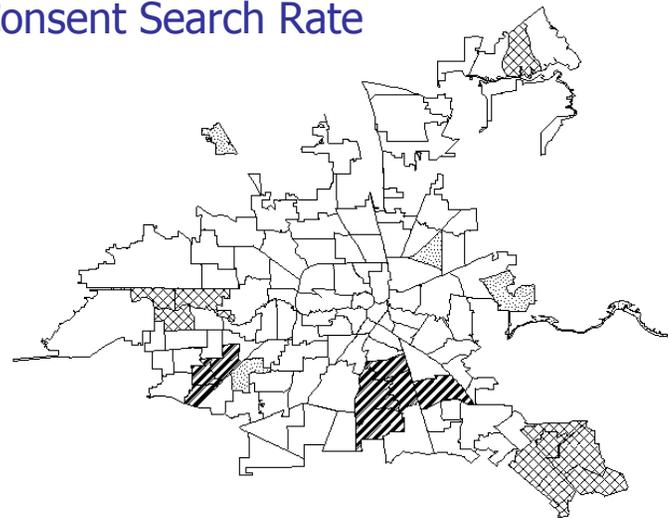
Investigatory Stop Rate



Arrest Rate

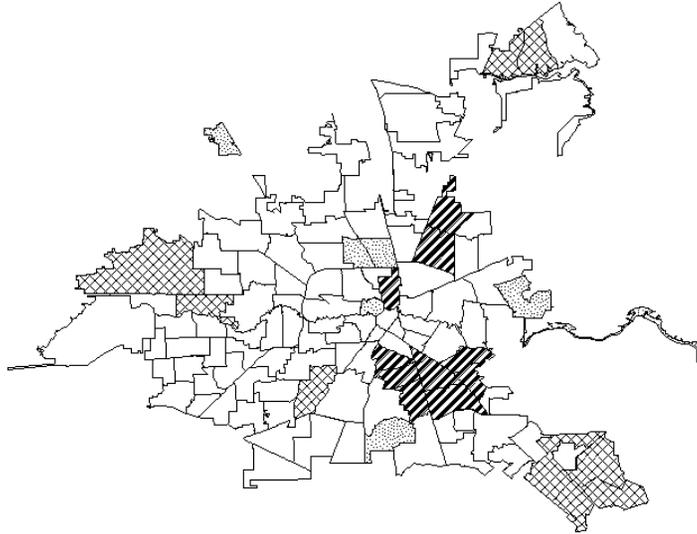


Consent Search Rate

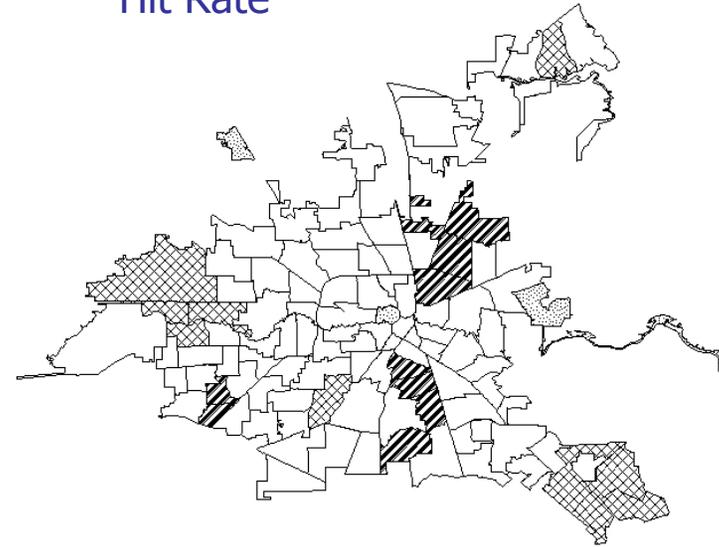


LISA Cluster Maps of Traffic Stops and Police Treatment

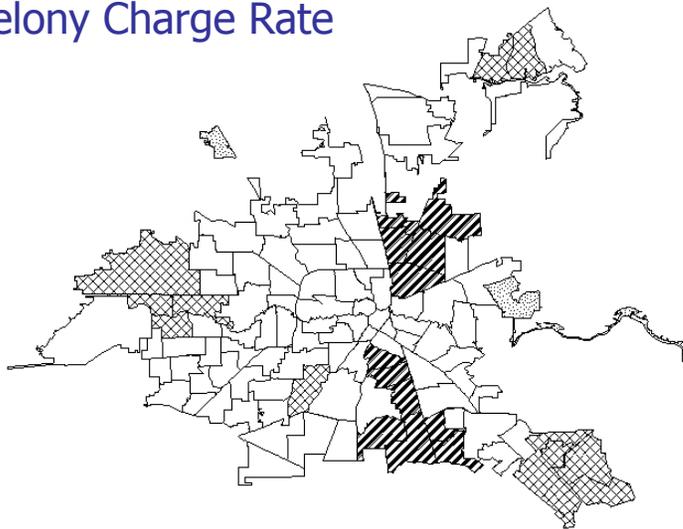
Probable Cause Search Rate



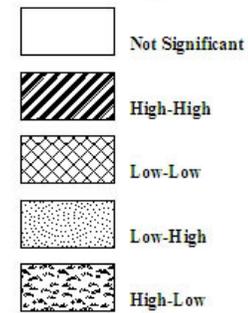
"Hit Rate"



Felony Charge Rate



LISA Cluster Map



LISA Cluster Maps of Traffic Stops and Police Treatment

OLS Regression Model for Traffic Stops

	<i>STOP#</i>	<i>INVST</i>	<i>ARRST</i>	<i>CONST</i>	<i>PROB</i>	<i>CONTR</i>	<i>FELON</i>	<i>RELS</i> <i>/INVST</i>	<i>SRCH</i> <i>/N_MOV</i>	<i>SRCH</i> <i>/MOV</i>	<i>CONTR</i> <i>/SRCH</i>
INDEPENDENT VARIABLE	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)
BLACK RATE	2.06* (1.02)	.03* (.01)	.01 (.00)	.16** (.05)	.02* (.01)	.01** (.00)	.02** (.00)	.01 (.01)	.01* (.01)	.02** (.00)	.02** (.01)
HISPANIC RATE	6.75 (6.07)	-.03 (.08)	.11** (.03)	.72* (.30)	.09* (.04)	.01 (.02)	.05* (.02)	-.11* (.05)	-.03 (.04)	.06* (.03)	-.03 (.03)
DEPLOYMENT	13.85** (3.59)	-.05 (.05)	.04* (.02)	.28 (.18)	.07** (.02)	.03** (.01)	.04** (.01)	-.07* (.03)	-.02 (.02)	.02 (.02)	.05* (.02)
DENSITY	8.78** (2.86)	.12** (.04)	.03* (.01)	.20 (.14)	.02 (.02)	.01 (.01)	.00 (.01)	-.05* (.02)	.03 (.02)	.01 (.01)	.01 (.02)
CONSTANT	28.34	0.27	0.04	-4.40	0.23	0.08	0.12	0.87	0.14	0.07	0.26
R2	0.34	0.12	0.27	0.22	0.25	0.29	0.29	0.19	0.09	0.24	0.18
ADJUSTED R2	0.31	0.08	0.24	0.19	0.22	0.26	0.26	0.16	0.05	0.21	0.15

** $p < .01$; * $p < .05$

Spatial Lag Model for Traffic Stops

	<i>STOP #</i>	<i>INVST</i>	<i>ARRST</i>	<i>CONST</i>	<i>PROB</i>	<i>CONTR</i>	<i>FELON</i>	<i>RELS</i> / <i>INVST</i>	<i>SRCH</i> / <i>N_MOV</i>	<i>SRCH</i> / <i>MOV</i>	<i>CONTR</i> / <i>SRCH</i>
Independent Variable	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)	b (S.E.)
BLACK RATE	2.24* (1.00)	.01 (.01)	.00 (.00)	.15** (.05)	.01 (.01)	.01** (.00)	.01** (.00)	.01 (.01)	.01* (.01)	.02** (.00)	.01* (.00)
HISPANIC RATE	7.77 (5.92)	-.06 (.06)	.05* (.03)	.67* (.29)	.05 (.04)	.00 (.02)	.02 (.02)	-.09 (.05)	-.02 (.03)	.05 (.03)	-.02 (.03)
DEPLOYMENT	13.78** (3.47)	-.00 (.04)	.04** (.01)	.27 (.17)	.06** (.02)	.02** (.01)	.03** (.01)	-.06* (.03)	-.01 (.02)	.02 (.02)	.04* (.02)
DENSITY	9.19** (2.79)	.06* (.03)	.03** (.01)	.20 (.14)	.02 (.02)	.01 (.00)	.01 (.00)	-.05* (.02)	.03 (.01)	.01 (.01)	.01 (.01)
SPATIAL LAG	-.12 (.10)	.68** (.07)	.59** (.07)	.08 (.08)	.40** (.08)	.56** (.08)	.60** (.07)	.28** (.08)	.12 (.12)	.23* (.11)	.33** (.09)
CONSTANT	34.28	0.08	-.04	-4.06	0.11	0.02	0.02	0.67	0.12	0.06	0.16
R2	0.35	0.49	0.52	0.23	0.39	0.50	0.55	0.29	0.10	0.27	0.27

** $p < .01$; * $p < .05$

What have and have not been found

■ Have been found

- Minorities were disproportionately stopped and were more adversely treated.
- People were more likely to be stopped and subjected to adverse police treatment in minority areas where greater police forces were deployed.
- The racial disparity in traffic stops was in part associated with the racial characteristics and the police control of the areas.

■ Have not been found

- The effect of race upon traffic stops controlling for the spatial effects on the individual level
- Differences in police control: Legal or extralegal?
- The effect of over-policing upon the police-community relation
- The effect of other relevant macro variables: narcotics offense rates, calls for service