INFRASTRUCTURE, SAFETY,
AND ENVIRONMENT

Racial Profiling: Not Always Black and White

Greg Ridgeway

October 14, 2004

The Genesis of the Issue: New Jersey and Maryland

- A 1993 study of stops on the New Jersey turnpike found evidence of racial profiling
  - Of the stopped drivers, 35% were black but black drivers composed 15% of drivers exceeding the speed limit by more than 5 mph
  - Troopers testified to being coached to patrol for a race profile
- Maryland state police were urged to be on the lookout for black drivers in rental cars with Virginia tags as suspected drug traffickers
  - A 1996 study of I-95 found 30% of drivers stopped were black, although blacks accounted for only 17% of the speeders

Racial Profiling Is a Growing Concern

- Racial profiling is a significant social problem
  - 42% of African-Americans say they've been stopped because of race
  - 59% of public believe problem is widespread, and 81% disapprove of the practice
- Public concern has led to state and local-level action
  - At least 14 states have passed legislation to deal with it
  - Many localities collect data voluntarily; some are compelled to do so by U.S. Justice Department
  - More than 400 police agencies now compile data on racial distribution of stopped motorists
- Congress is considering End of Racial Profiling Act
  - Mandates data collection to receive Federal funds

Unfortunately, Quality of the Analysis Using Collected Data Is Weak

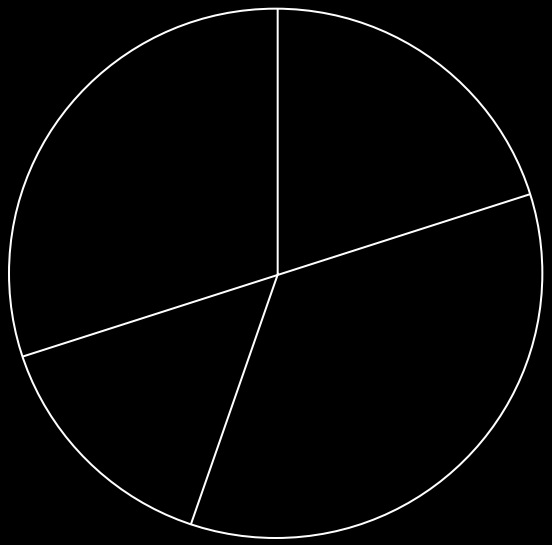
- Growing number of claims of racial profiling based on analysis of data collected
  - Texas: Concluded that "75% of agencies stop more black and Latino drivers than white drivers"
  - Massachusetts: 68% of agencies marked as racial profiling as a result of flawed measures
- Some studies hastily conclude no profiling
  - Sacramento: Found that the percentage of black drivers stopped matched the percentage of blacks among crime suspect descriptions

Why Is Testing for Racial Profiling So Hard?

Racial Distribution of People Stopped

Racial Distribution of People at Risk of Being Stopped

Difference Between



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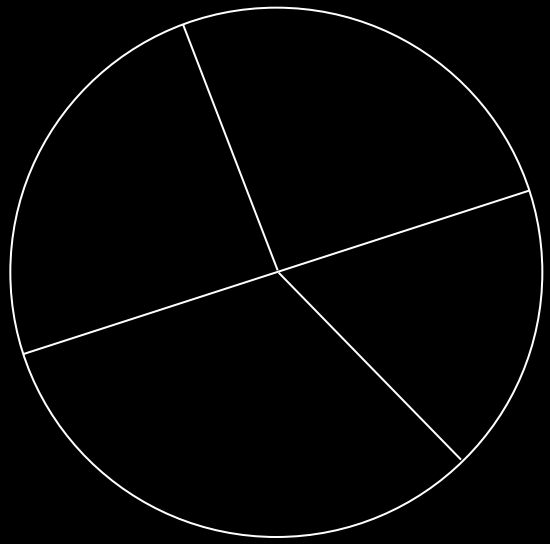

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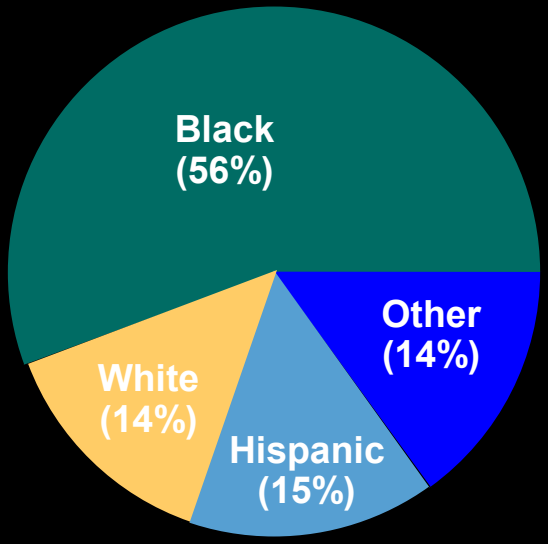

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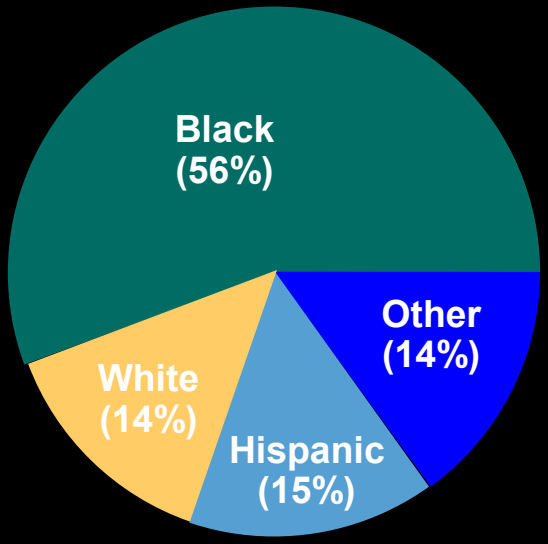

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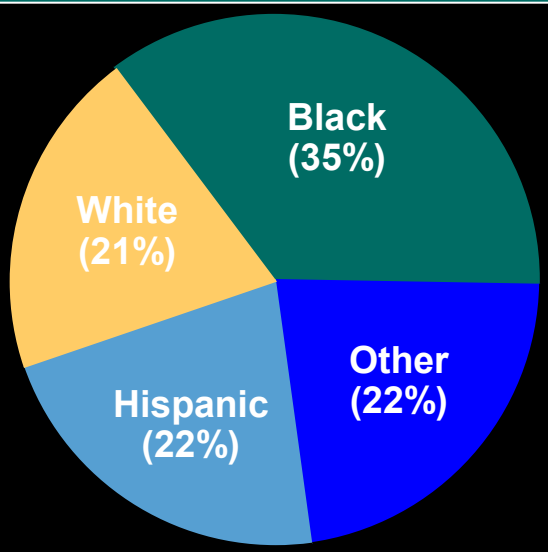

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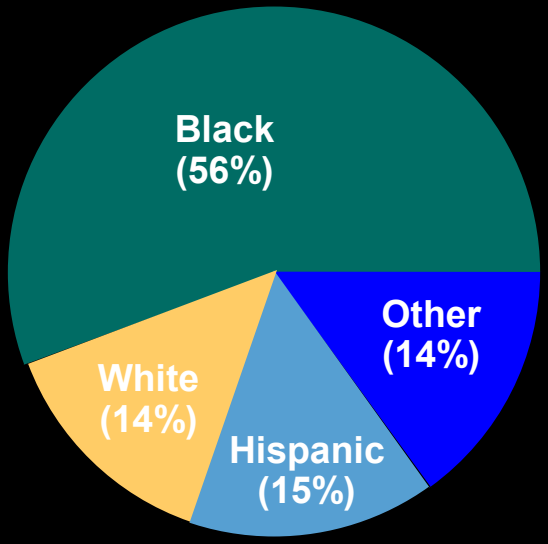

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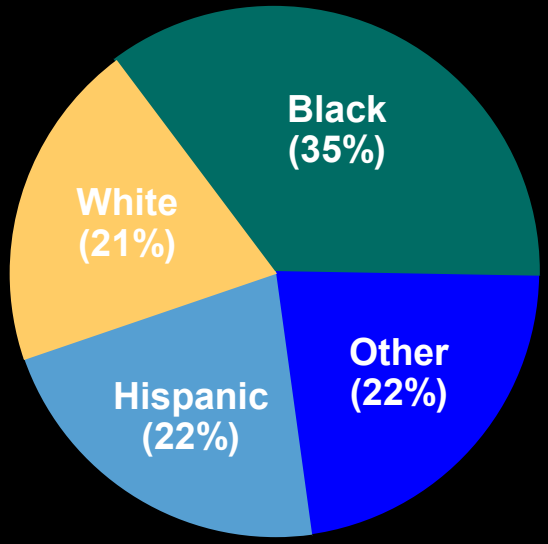

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  - Driving behavior: car ownership, time on the road, and care
  - Exposure to police

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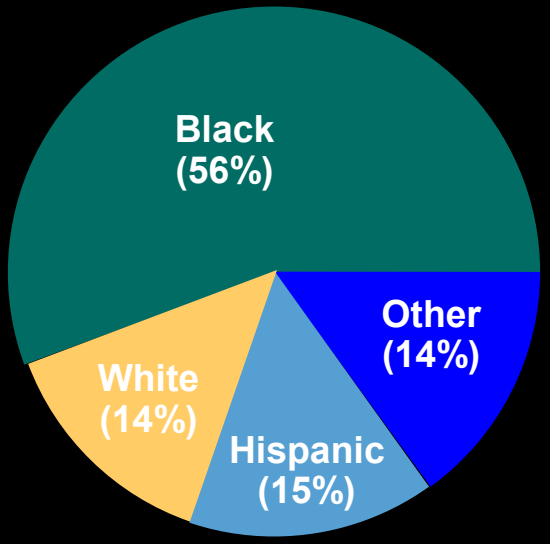

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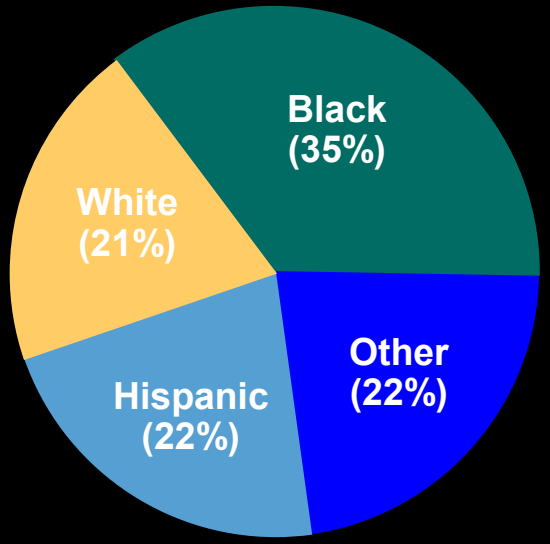

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Other approaches to dealing with issue are also problematic

Approaches to Dealing with "Benchmarking" Problem Are, in Turn, Problematic

Approach	Problem
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Using traffic surveys	
Using only outcomes of the stop	

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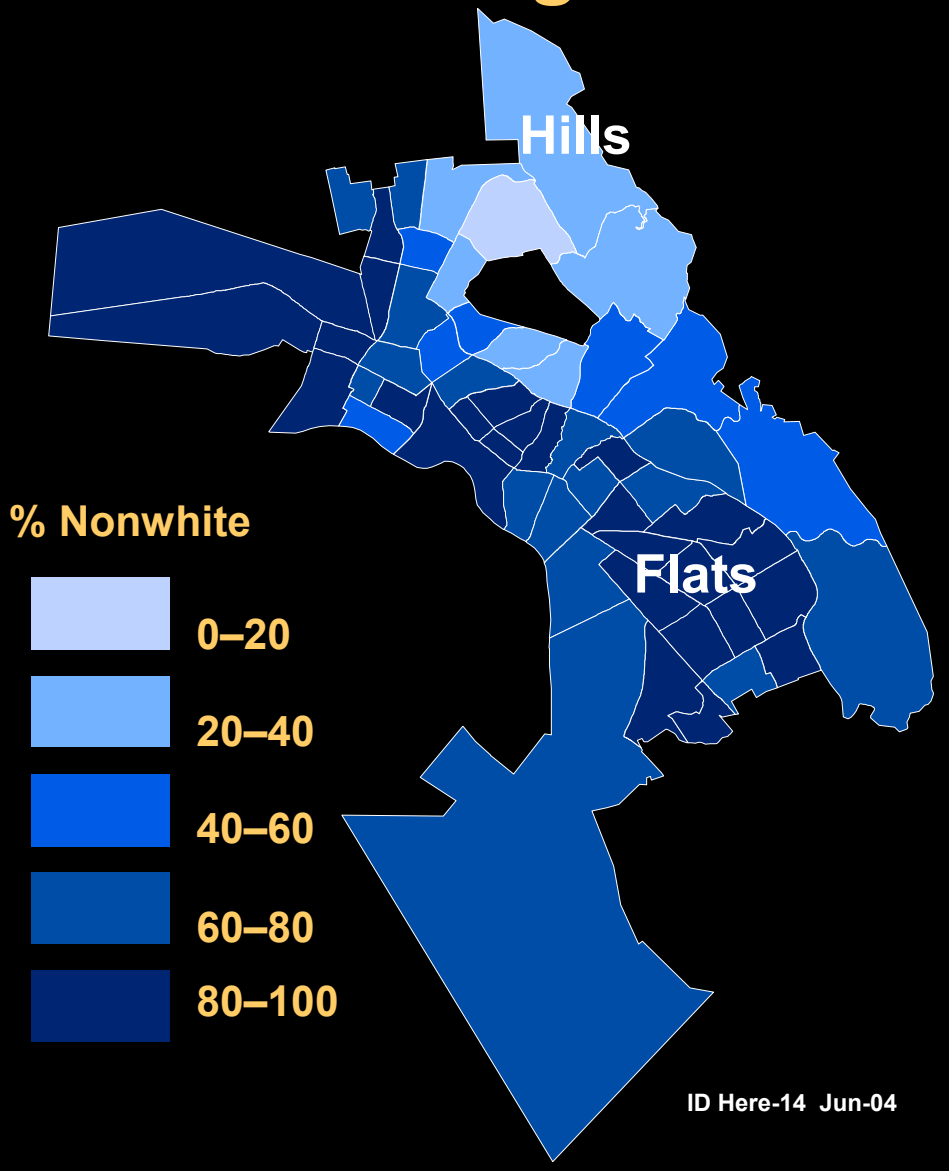
Using traffic surveys	• Are expensive • Validity may fail in multi-ethnic environments • Provides only limited measure of driver care
Using only outcomes of the stop	• Avoids the challenging problem of detecting bias in the decision to stop

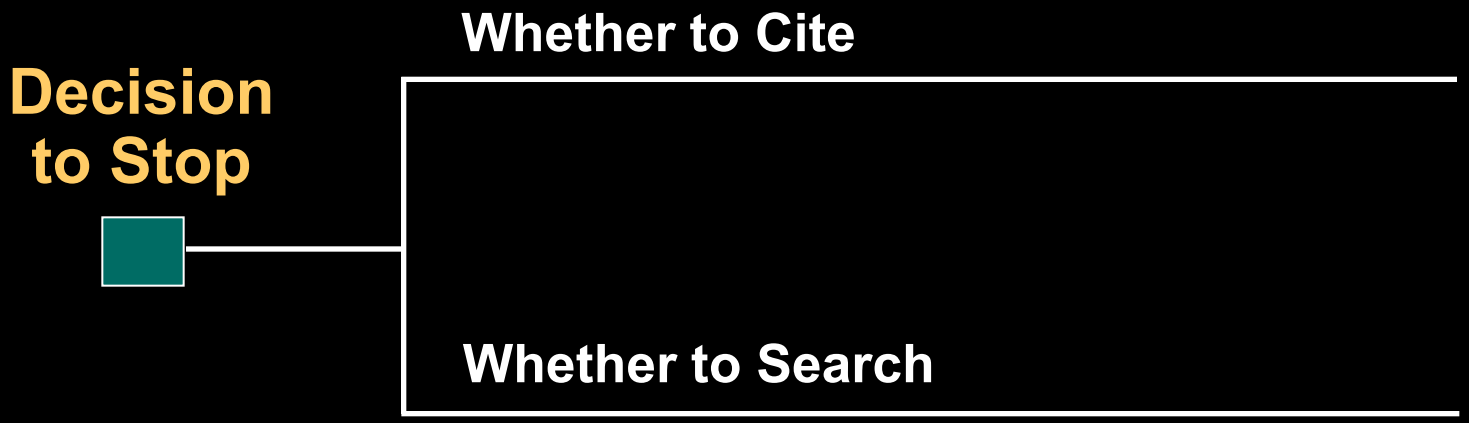
RAND Focused on Applying New Approaches to Assessing Racial Profiling

- Assess whether there is racial profiling in the decision to stop
  - Using "veil of darkness" approach
- Assess whether there is racial profiling in post-stop activity
  - Using propensity score analysis approach
- Use data from Oakland Police Department
  - 7,607 recorded vehicle stops
  - Between 6/15/03 and 12/30/03



Is There Racial Profiling in Oakland?

Post-Stop Activity



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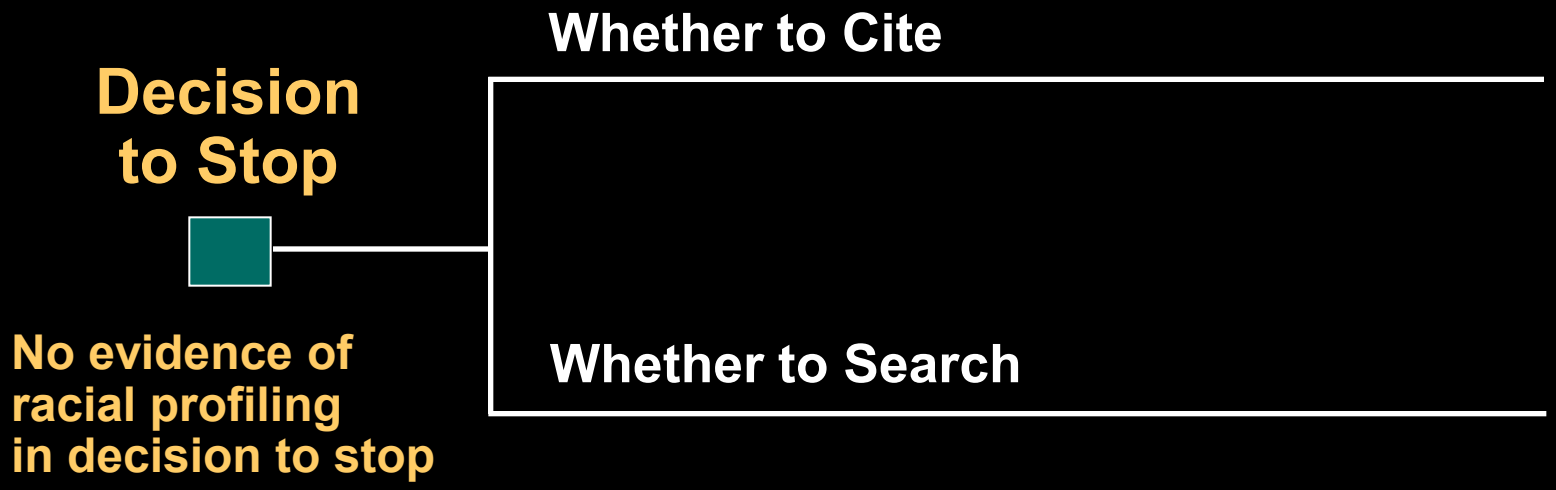
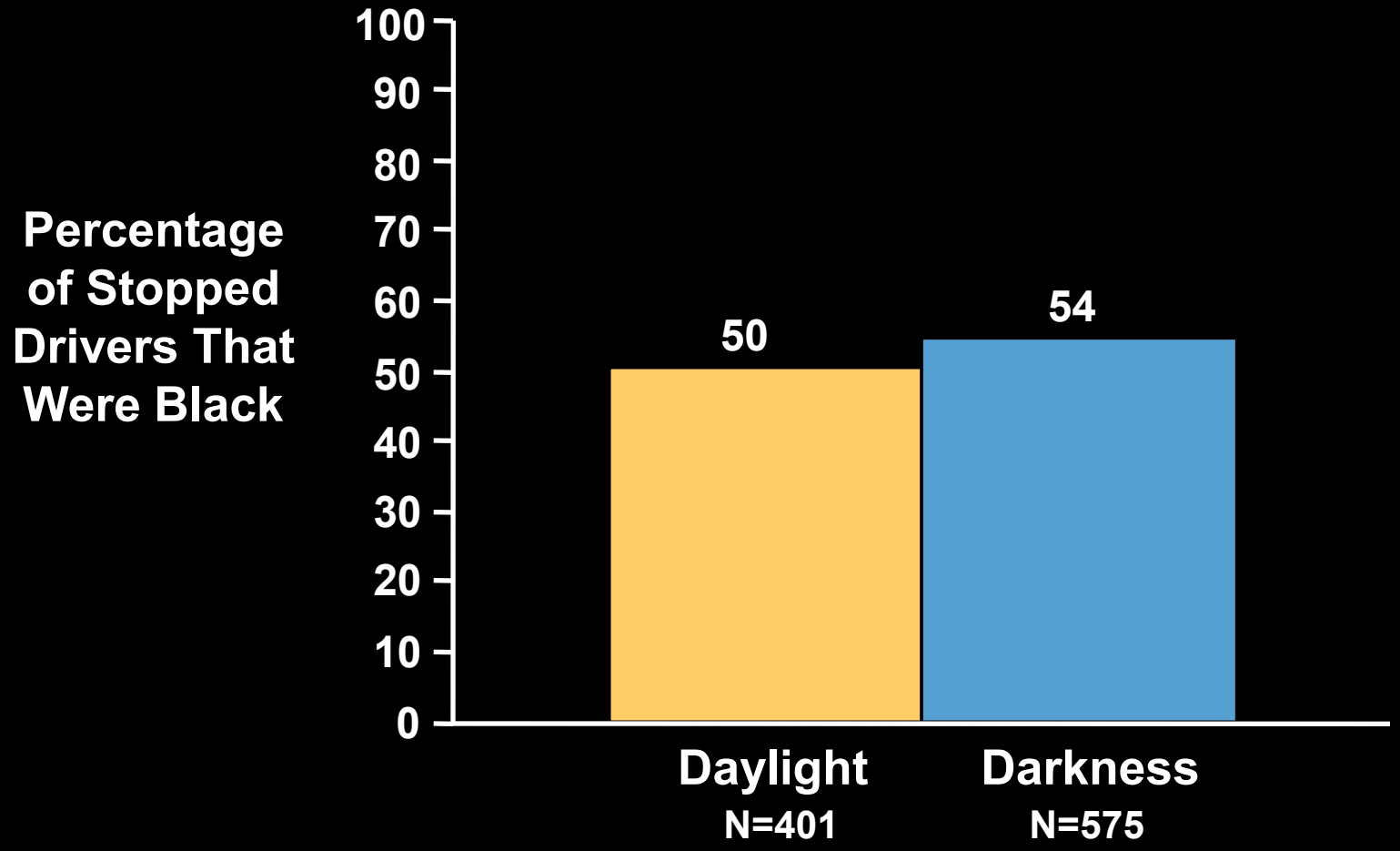


Veil of Darkness Approach Relies on Natural Lighting Experiment to Assess Racial Profiling

- **Does an officer's ability to identify the race of the driver in advance influence which drivers they stop?**
- **The ability to identify race in advance of the stop decreases as it becomes dark**
- **We directly test whether the ability to identify the race affects the race distribution of the stopped drivers**

Simple Veil of Darkness Test Shows No Evidence of Racial Bias in the Decision to Stop



Adjusted Veil of Darkness Test

- **Consider the relative stop rate for black and non-black drivers**

$$\frac{P(S \mid B)}{P(S \mid \overline{B})}$$

Adjusted Veil of Darkness Test

- **Consider the relative stop rate for black and non-black drivers**
- **Adjust for clock time and natural lighting**

$$\frac{P(S \mid B, t, \text{Light})}{P(S \mid \overline{B}, t, \text{Light})}$$

Adjusted Veil of Darkness Test

- **Consider the relative stop rate for black and non-black drivers**
- **Adjust for clock time and natural lighting**
- **In the absence of racial profiling K equals 1**

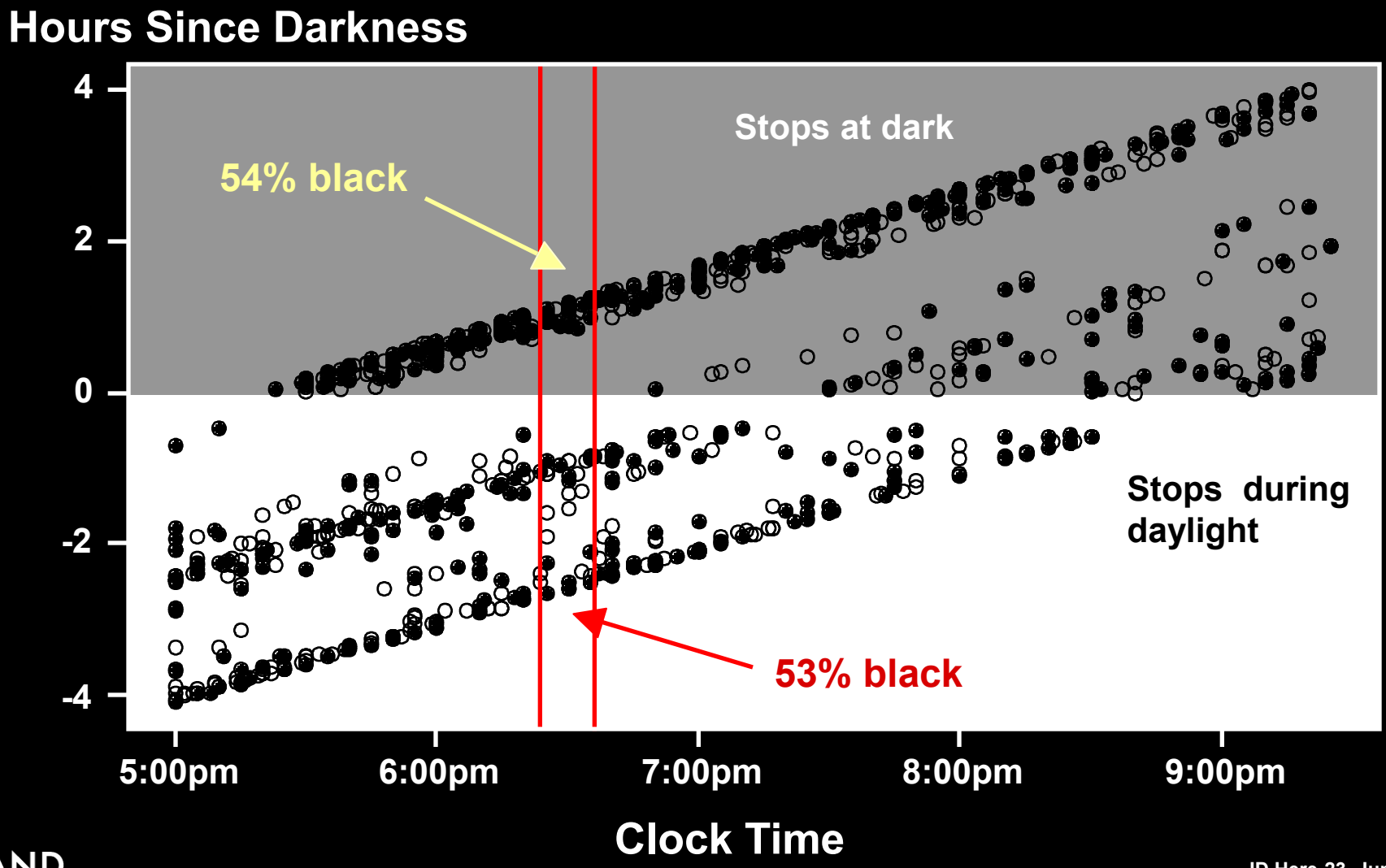
$$\frac{P(S \mid B, t, \text{Light})}{P(S \mid \overline{B}, t, \text{Light})} = K \frac{P(S \mid B, t, \text{Dark})}{P(S \mid \overline{B}, t, \text{Dark})}$$

Decomposition of the Racial Profiling Effect

$$K = \text{odds ratio for the reported stops} \times \text{exposure term} \times \text{reporting term}$$

- **Stop term**: **Logistic regression fit to reported stops, predicting whether the driver was black from clock time and darkness**
- **Exposure term**: **Equals 1 if the mix of exposed black and non-black drivers is the same day vs. night**
- **Reporting term**: **Equals 1 if the reporting rate does not change day vs. night, but may differ by race**

Adjusting for "Clock Time" Does Not Change the Finding



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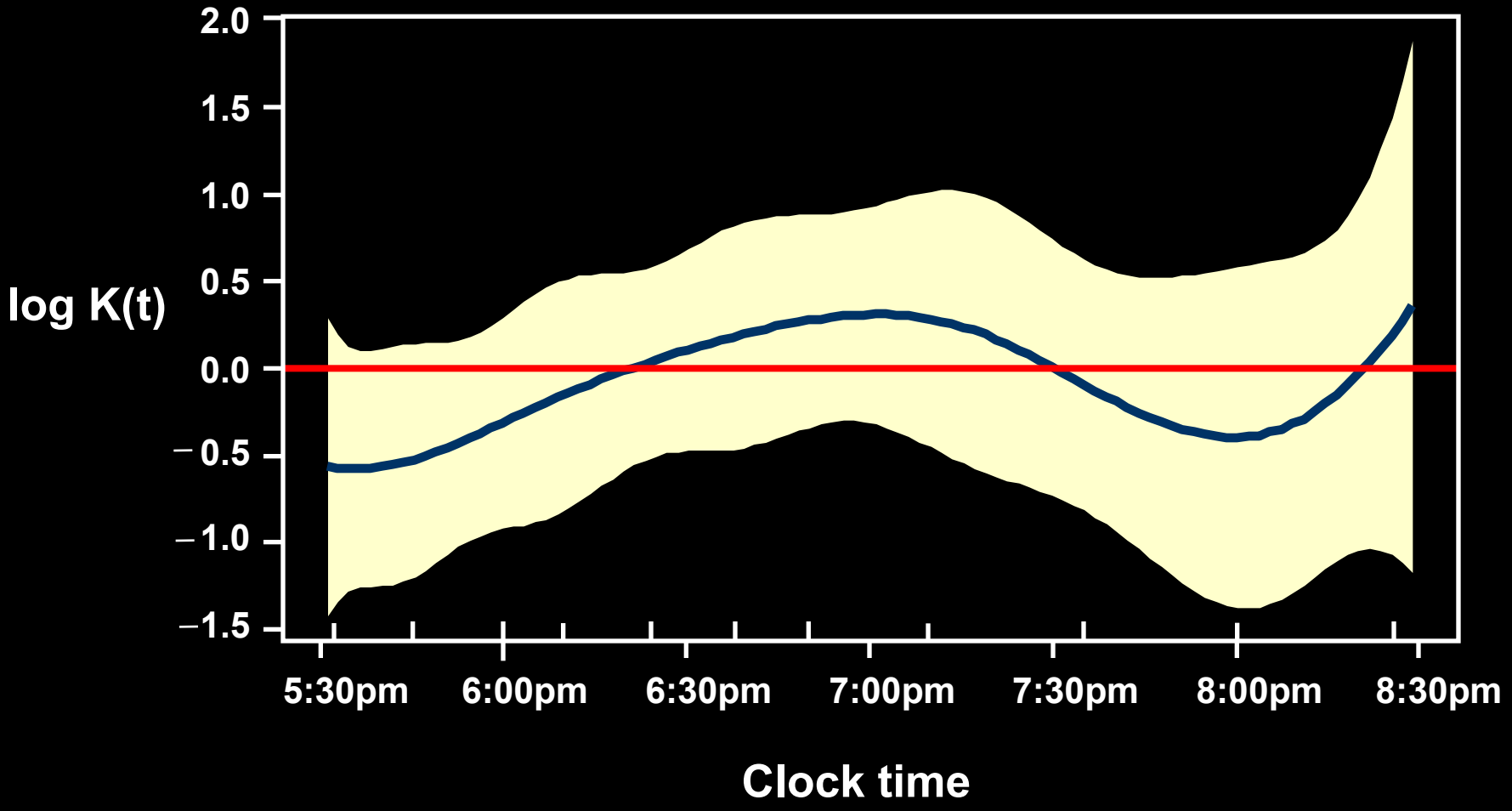
No Evidence of Race Bias in Stop Decisions



Sensitivity Analysis Tests Show the Findings Are Robust

Issue	Analysis Result
Could still be racial bias if many fewer black drivers were at risk of being stopped during the day	• But to change finding, difference in exposure would need to change by 10 percentage points • Unlikely given control for clock time
Could still be racial bias if there were seasonal changes in racial distribution over June–December period	• But repeating analysis using only October and November data does not change the finding
Could still be racial bias because stops are under-reported in the data	• But approach is robust to some kinds of underreporting, even if reporting rates differ for black/nonblack drivers

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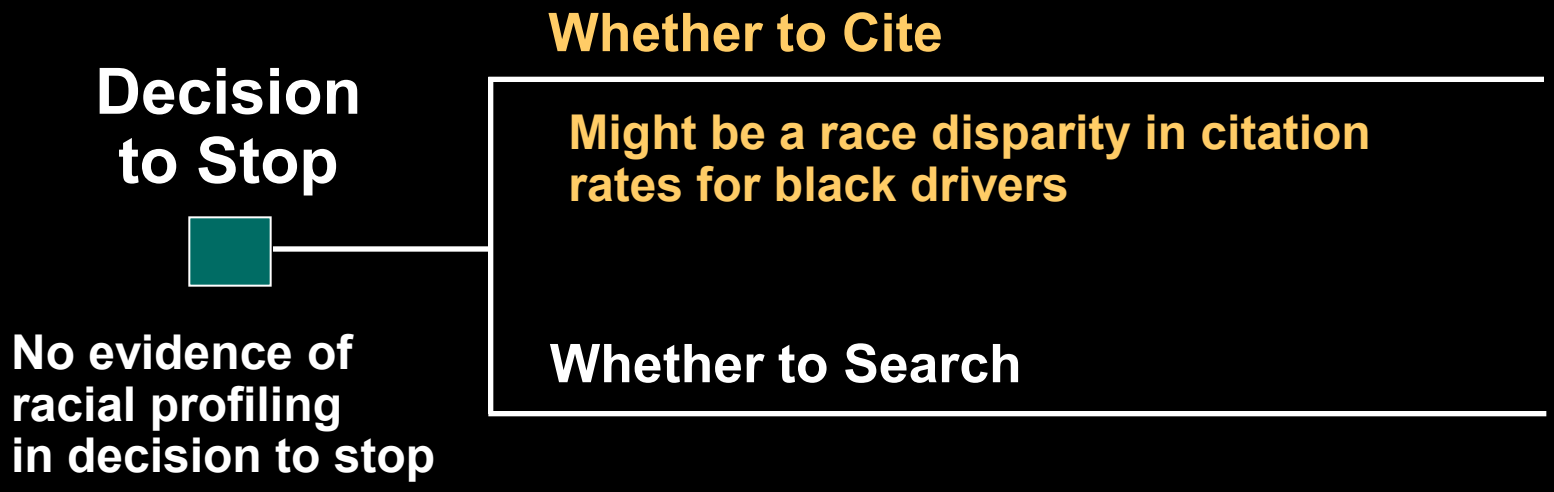

Propensity Score Analysis Created Comparison Group in Terms of Stop Features

Stop Feature	% Black Drivers (N=3,703)	% Nonblack Drivers (unweighted) (N=3,033)
Region East ⋮	32%	14%
Time of Day 12AM-4AM ⋮	16%	7%
Resident	76%	64%
Age 18-29 ⋮	47%	38%
Reason Mechanical/ Registration ⋮	26%	16%
Male	75%	74%

Adjust for Confounding Variables

- **Weight stops involving non-black drivers so that the joint distribution of their features matches those of stops involving black drivers**

$$f(\mathbf{x} \mid \text{black}) = w(\mathbf{x}) f(\mathbf{x} \mid \text{nonblack})$$

- **$w(\mathbf{x})$ is the propensity weight that the stop involves a black driver**

$$w(\mathbf{x}) = \frac{P(\text{black} \mid \mathbf{x})}{1 - P(\text{black} \mid \mathbf{x})}$$

Propensity Score Analysis Created Comparison Group in Terms of Stop Features

Stop Feature	% Black Drivers (N=3,703)	%Nonblack Drivers (weighted) (N=1,689)	% Nonblack Drivers (unweighted) (N=3,033)
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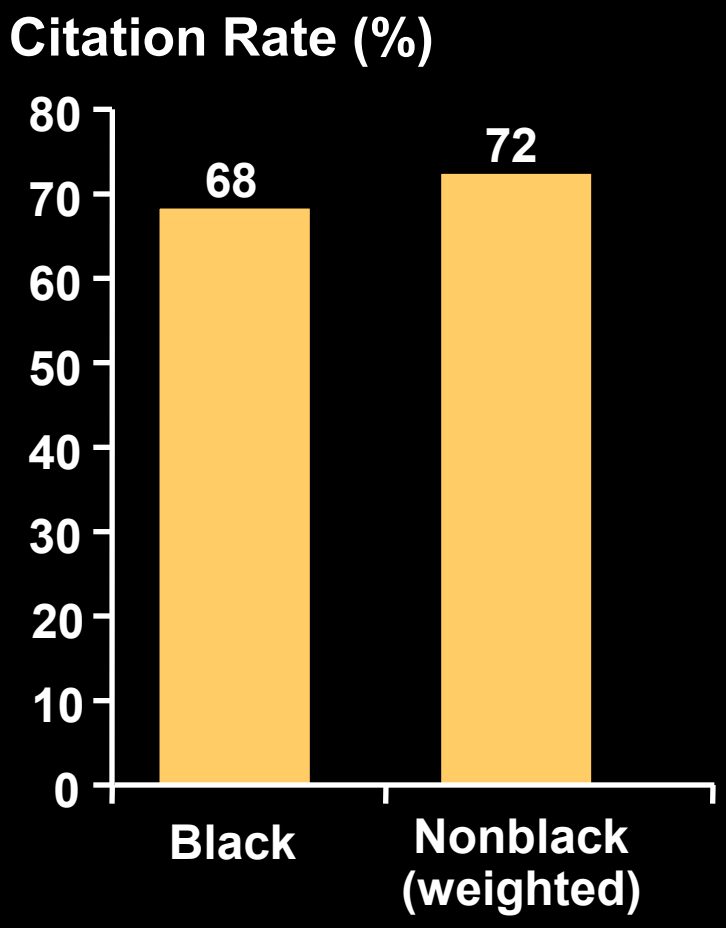
Analysis Shows That a Race Disparity in Citation Rates Might Exist



- Citation rate for black drivers is 4% less than for comparable non-black drivers
- Finding potentially implies that either
  - Police are slightly more hesitant to cite black drivers
  - Some of stops involving black drivers were of a level of severity unlikely to result in citation

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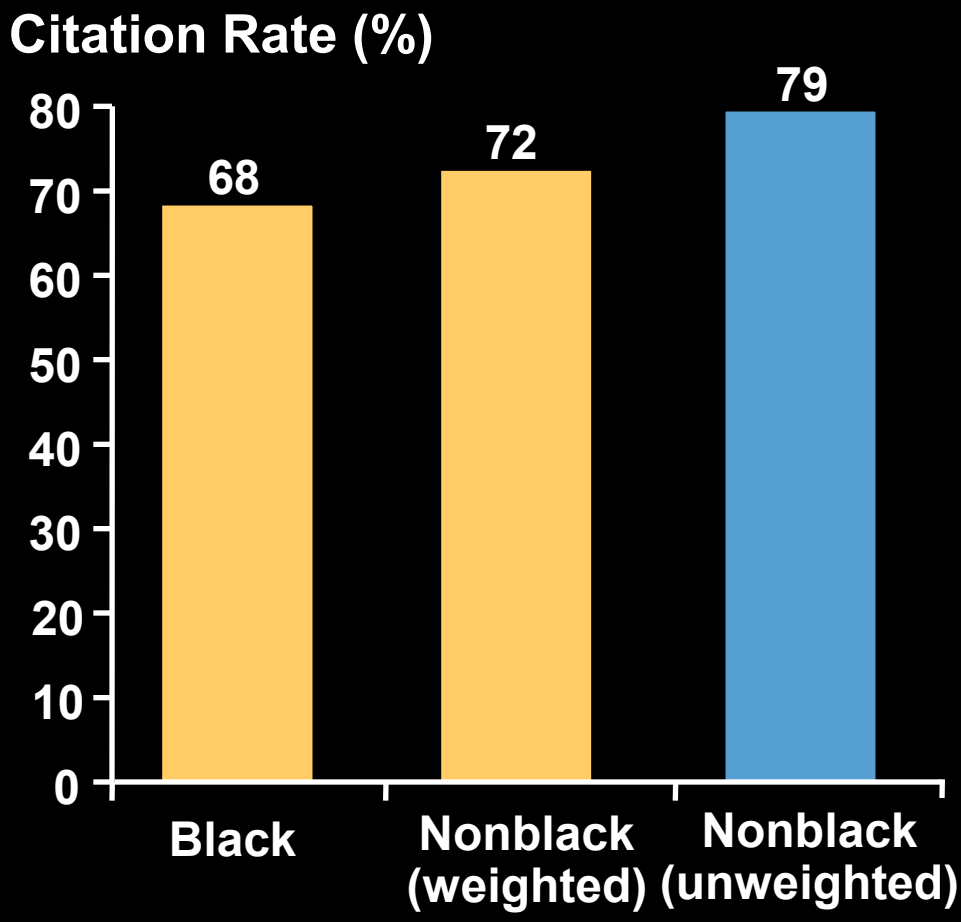
But the Analysis Also Shows the Danger of Making Naïve Comparisons



- When we compare black vs. nonblack (unweighted), difference is 11%
- Had we not adjusted for factors such as time and location of stop, we would have concluded that black drivers are *much* less likely to be cited than nonblack ones

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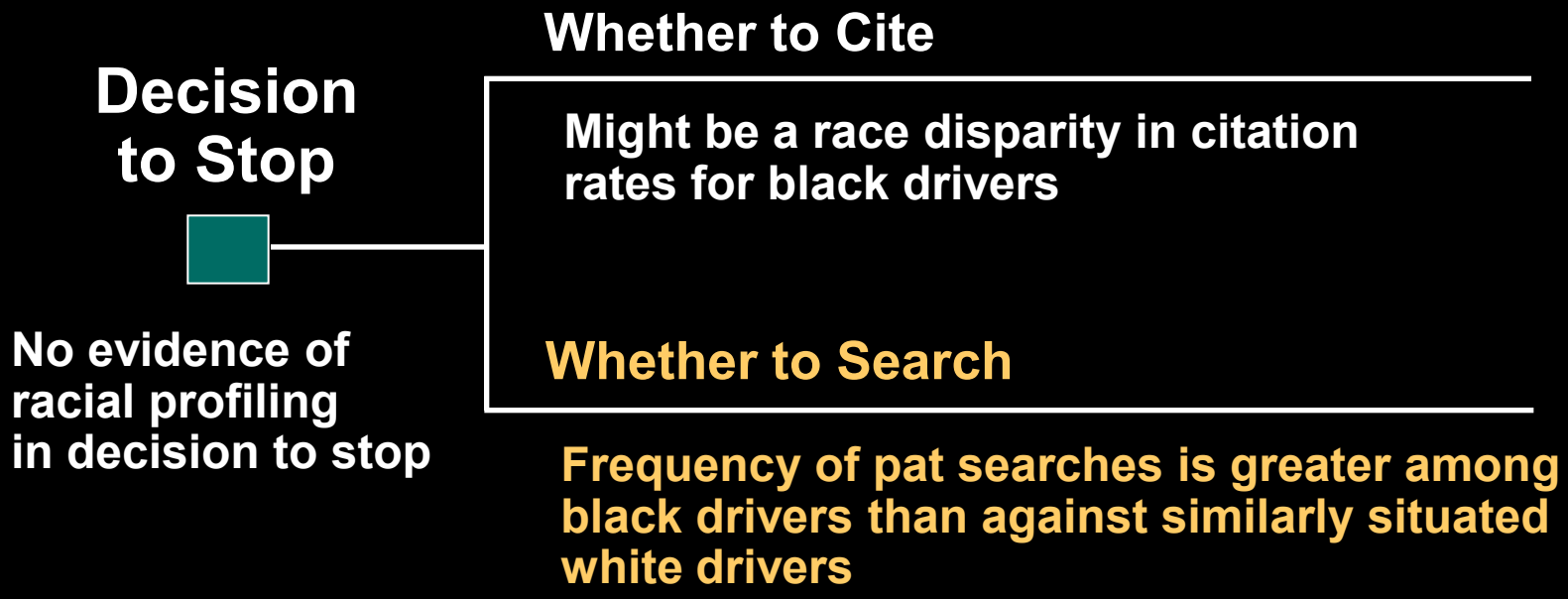
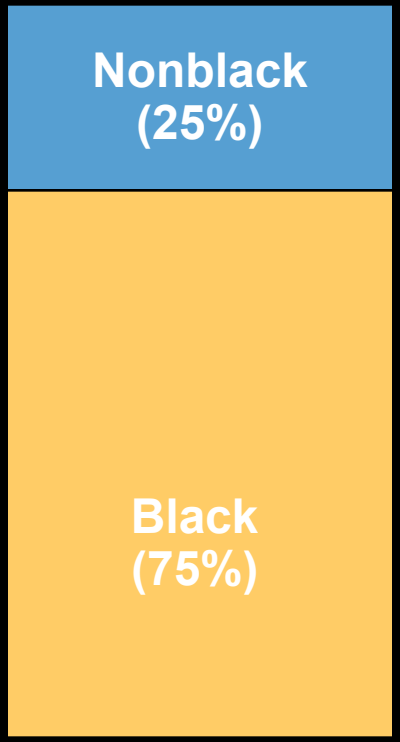
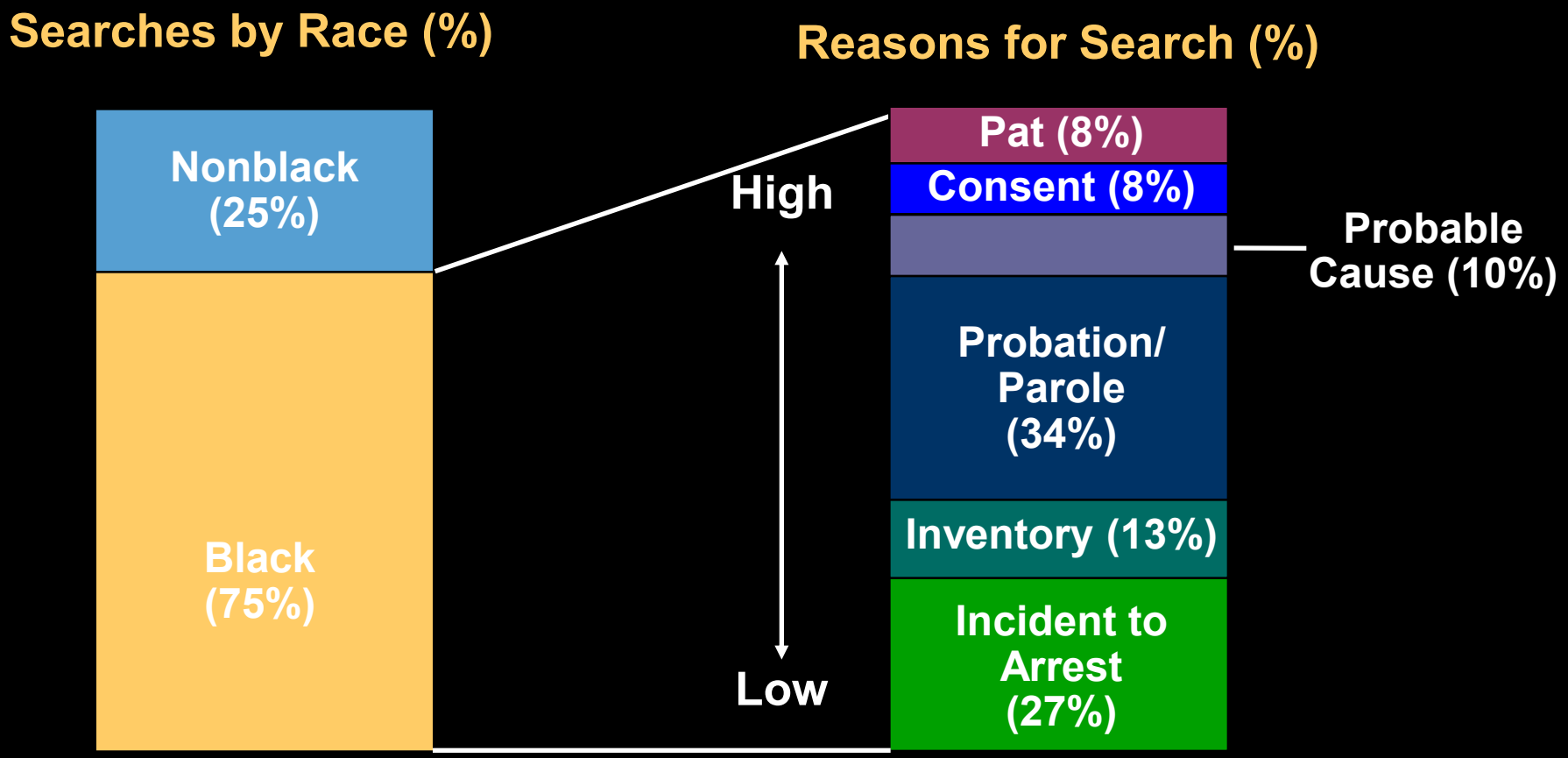


Black Drivers Bear the Burden of Searches

Searches by Race (%)



Black Drivers Bear the Burden of Searches but Most Searches Are Low-Discretion Ones



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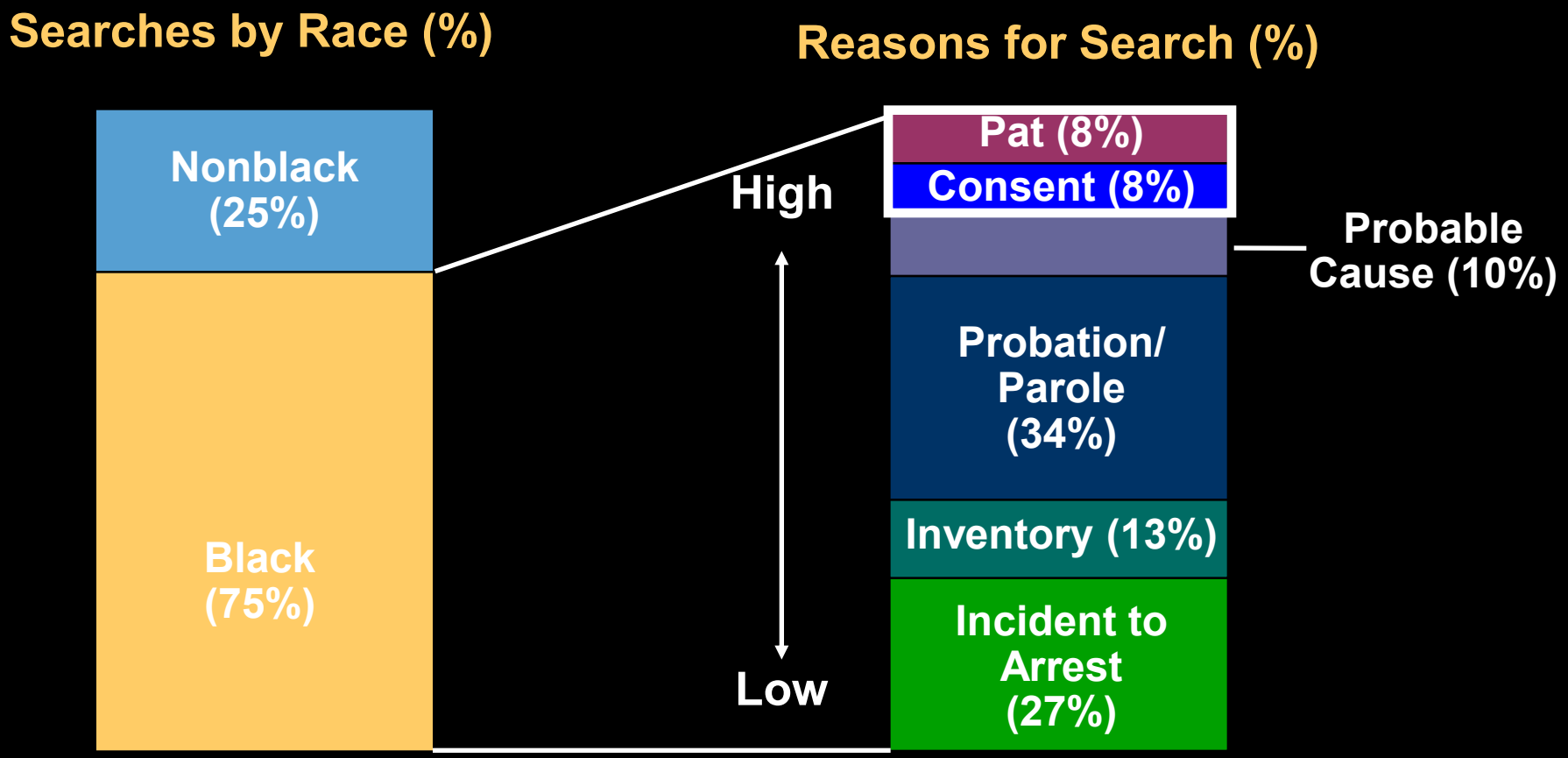
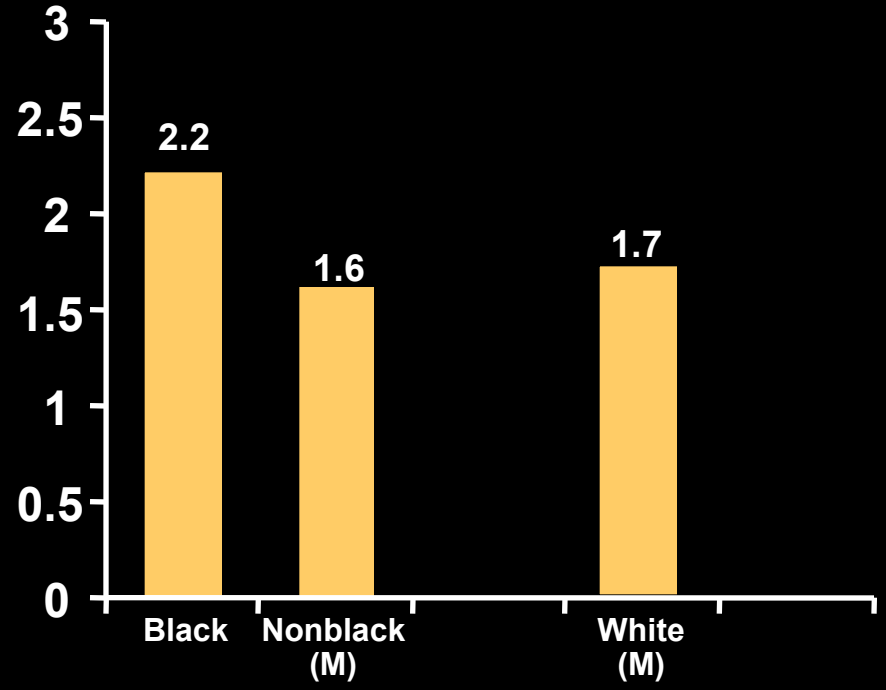


We focus on pat and consent searches

Consent Searches Have Similar Rates, but Pat Searches More Likely for Blacks Than Whites

Consent Searches (%)



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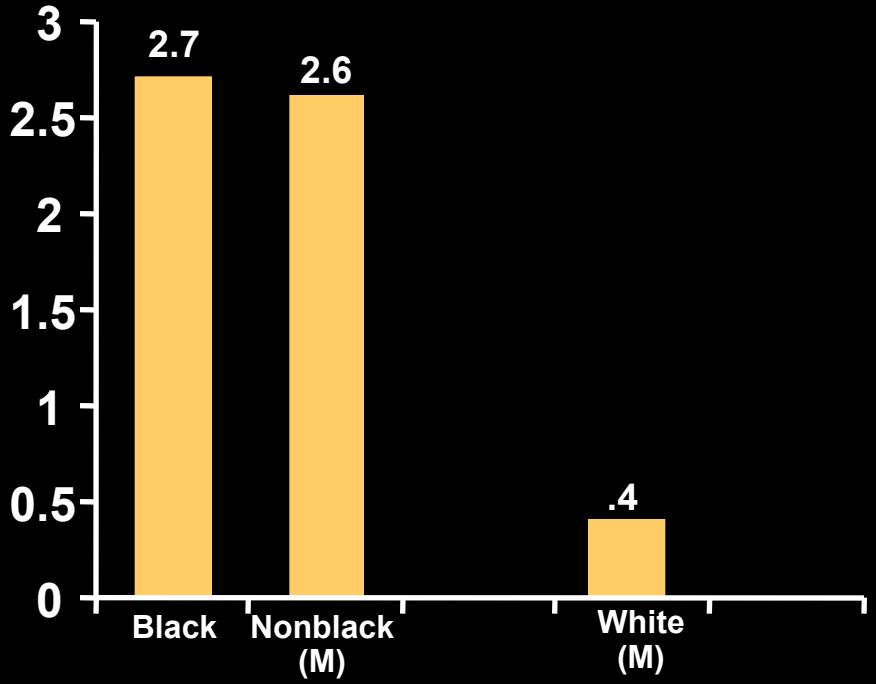

Once Again, Naïve Comparisons Can Distort the Findings

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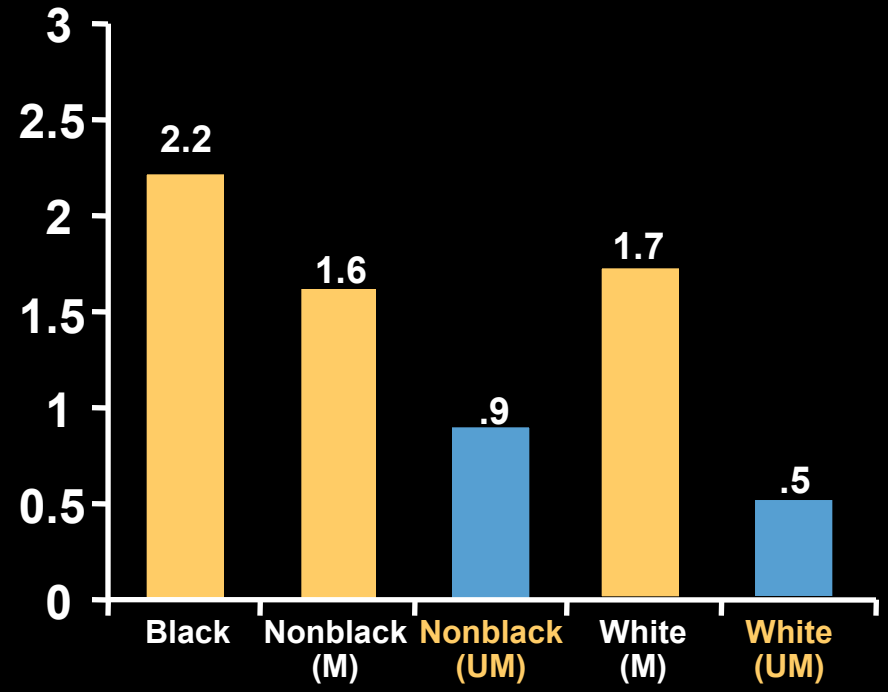

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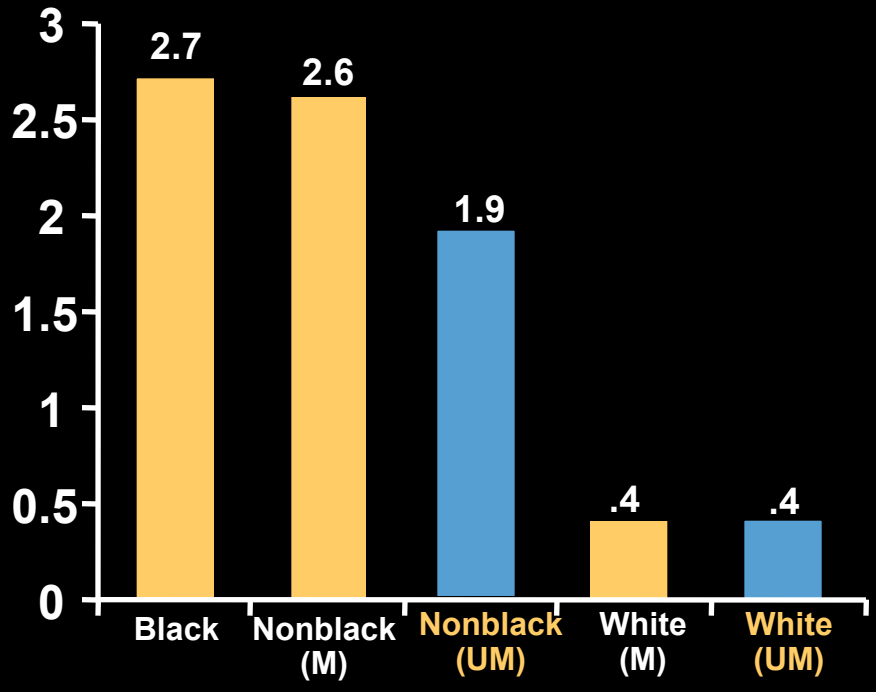

Summary: Is There Racial Profiling in Oakland?

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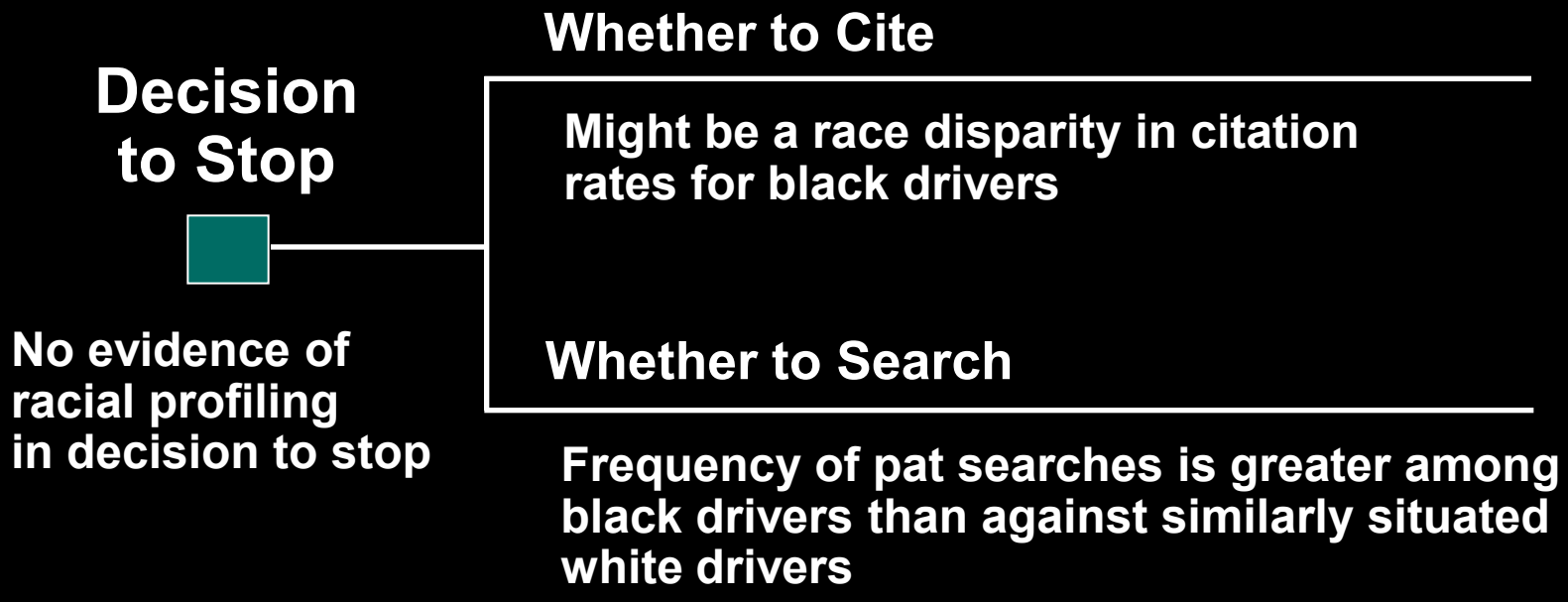

Broader Conclusions

- The goal of racial profiling analysis is to help departments identify potential problem areas
  - Oakland Police are pleased that all our findings may be addressed with policy changes and training
- Naïve analysis methods can exaggerate (or even understate) the effect of racial bias
- Importance of correct and coherent analyses increases as data collection becomes mandated

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We will be testing approach with data from other cities

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