
INFRASTRUCTURE, SAFETY,
AND ENVIRONMENT

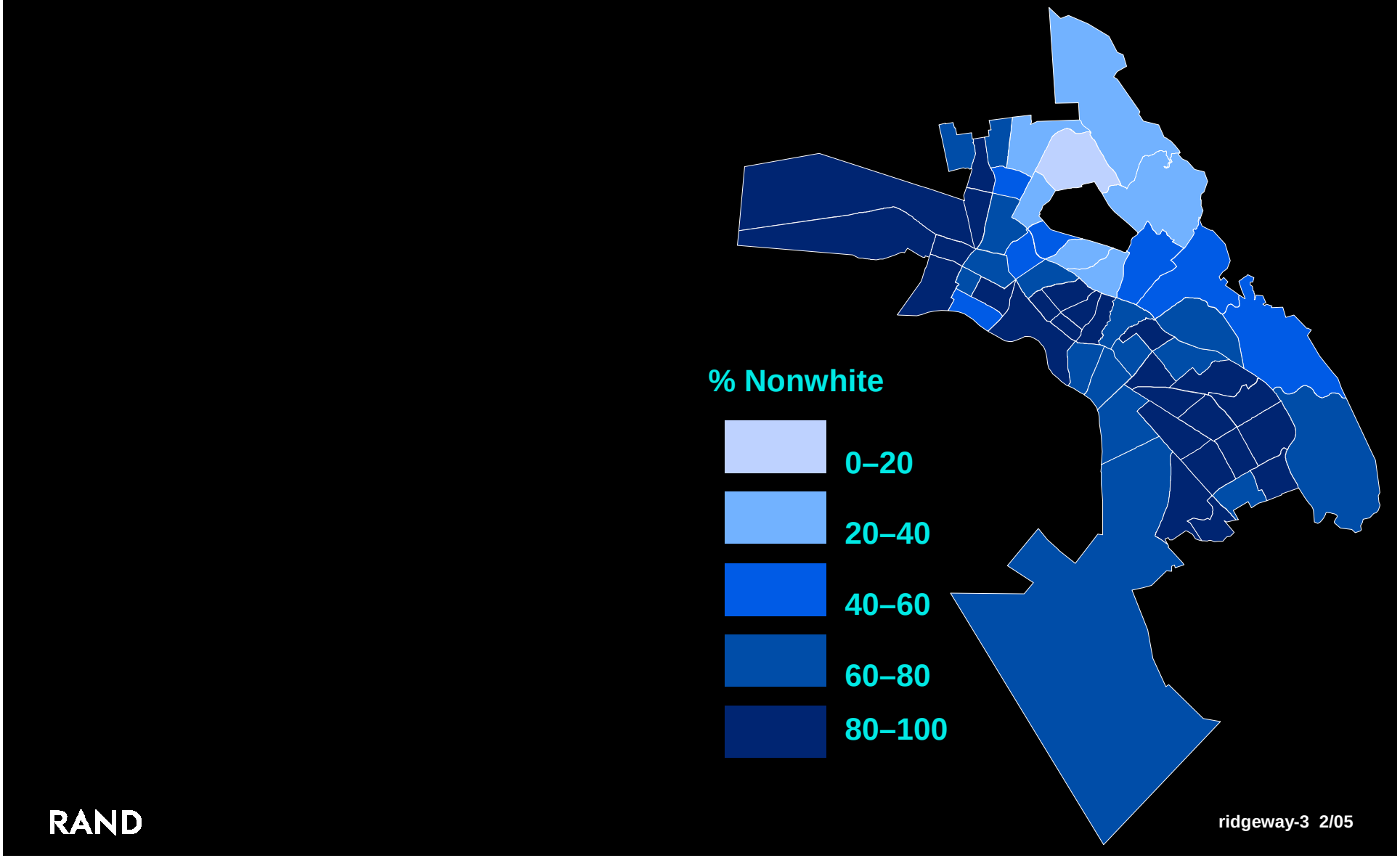
# *Analysis of Post-Stop Outcomes: Citations, Search, and Stop Duration*

***Greg Ridgeway, Ph.D.***
***Statistician***

# *Race might influence outcomes of the stop*

- **Goal: Determine whether race affects the decision**
  - to issue a citation versus a warning
  - to conduct a consent search
  - to pat search
  - to detain the vehicle for more than 10 minutes
- **Commonly used methods do not measure the effect of race**
  - Simple comparisons of rates across race groups
  - Multivariate regression does not sufficiently "control for" other factors

# *Race Groups Live in Different Oakland Neighborhoods*

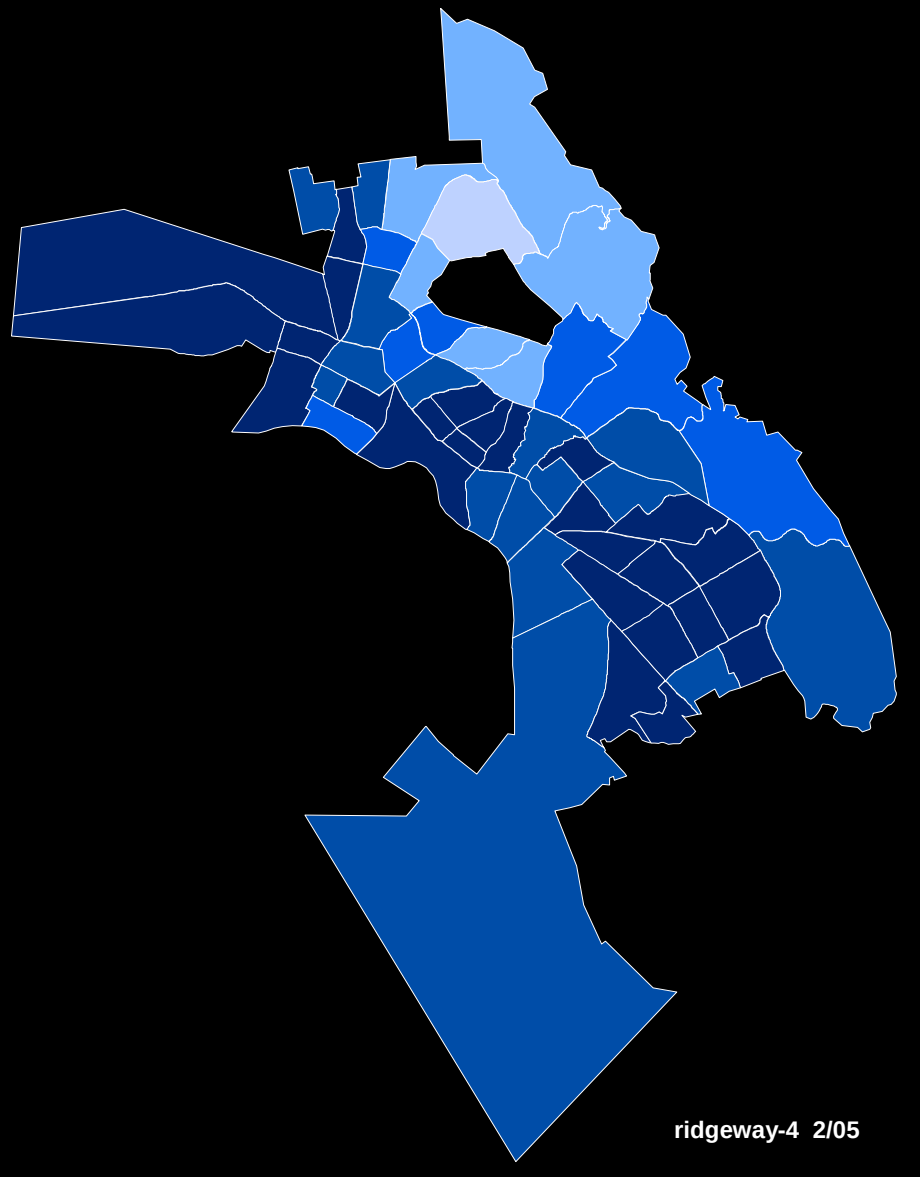



RAND

# *Black and Non-Black Drivers are Stopped in Different Parts of the City*

## % Stopped by Neighborhood

| Region | Black | Non-Black |
|---|---|---|
| Downtown | 31% | 27% |
| East | 32% | 13% |
| Hills | 1% | 3% |
| Midtown | 12% | 21% |
| North | 9% | 8% |
| South Hills | 3% | 6% |
| West | 14% | 21% |

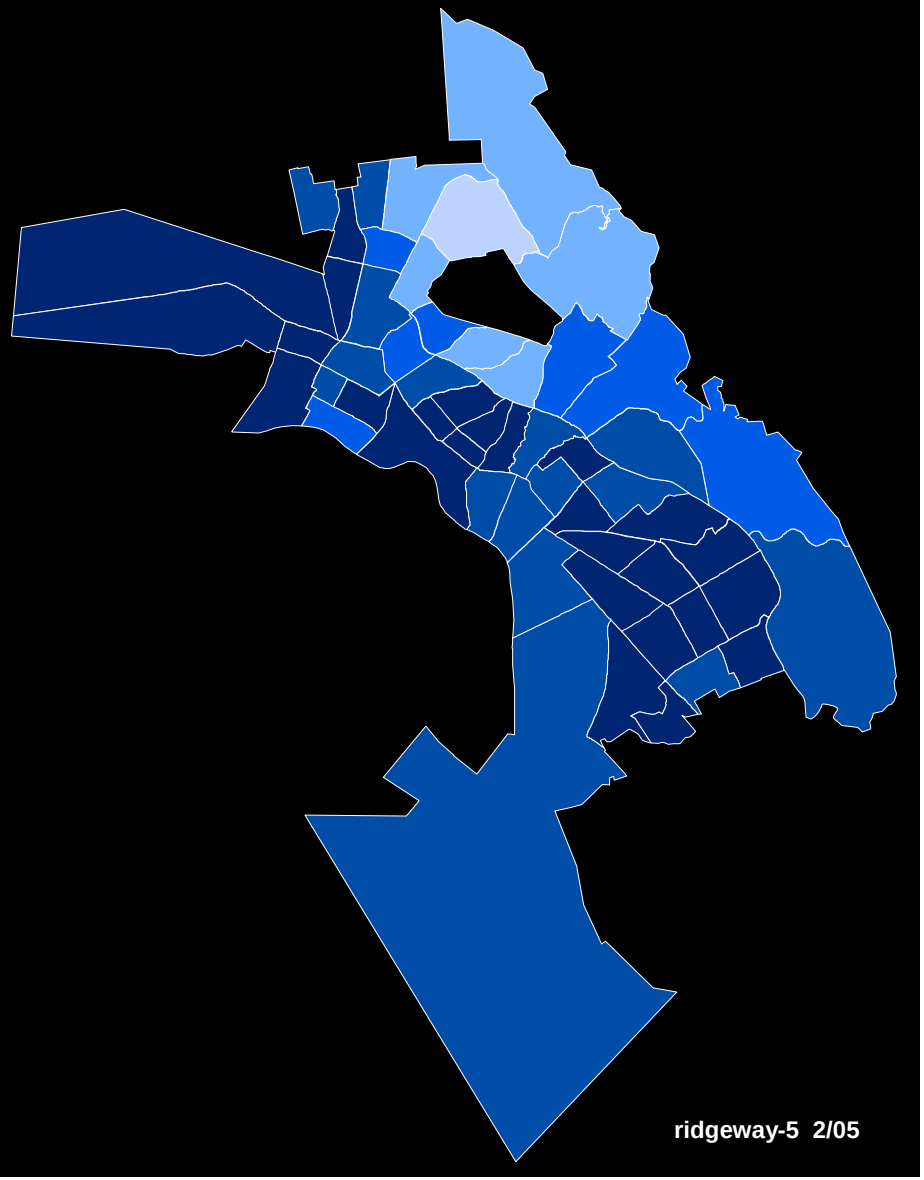


# *Black and Non-Black Drivers are Stopped in Different Parts of the City*

## % Stopped by Neighborhood

| Region | Black | Non-Black |
|---|---|---|
| Downtown | 31% | 27% |
| East | 32% | 13% |
| Hills | 1% | 3% |
| Midtown | 12% | 21% |
| North | 9% | 8% |
| South Hills | 3% | 6% |
| West | 14% | 21% |

Highest citation rates



# *Is the Difference Due to Race or Neighborhood?*

% Stopped by Neighborhood

| Region | Black | Non-Black |
|---|---|---|
| Downtown | 31% | 27% |
| East | 32% | 13% |
| Hills | 1% | 3% |
| Midtown | 12% | 21% |
| North | 9% | 8% |
| South Hills | 3% | 6% |
| West | 14% | 21% |

Highest citation rates

- **Citation rates**
  - **Black: 68%**
  - **Non-black: 79%**
- **Are black drivers stopped for no good reason?**
- **Are black drivers driving in neighborhoods where officers don't write tickets?**

# Drivers Differ on Several Features

| Stop Feature | % Black Drivers (N=3,703) | | % Nonblack Drivers (unmatched) (N=3,033) |
|---|---|---|---|
| Region | | | |
| East | 32% | | 14% |
| Hills | 1% | | 3% |
| ⋮ | | | |
| Time of Day | | | |
| 12AM-4AM | 16% | | 7% |
| ⋮ | | | |
| Age | | | |
| 18-29 | 47% | | 38% |
| ⋮ | | | |
| Reason | | | |
| Mechanical/ Registration | 26% | | 16% |
| ⋮ | | | |

# *Multivariate Regression Models Produce Biased Estimates When the Groups Don't Overlap*

- **To "control for" or "adjust for" stop features analyst might use multivariate logistic regression**

**Odds of receiving a citation =**

**K × Race factor × Neighborhood factor ×**

**Time of day factor × Reason for stop factor × …**

- **Differences in the race factors across the race groups are reported as bias**
- **Methods were intended to adjust for *small* differences between the groups**

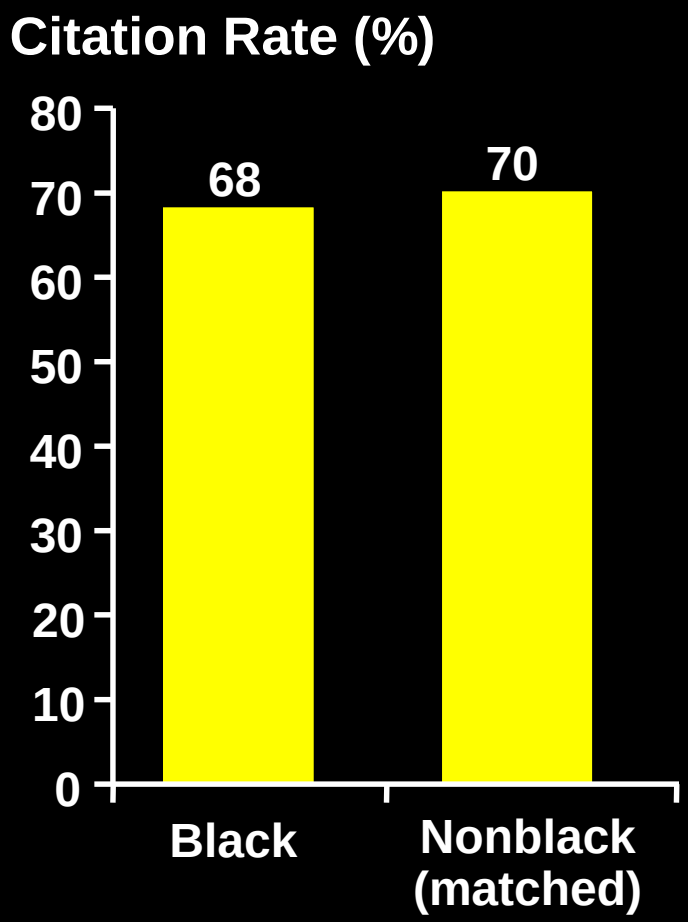
# *Select Non-Black Drivers That Have Stop Features Similar to Black Drivers*

| Stop Feature | % Black Drivers (N=3,703) | | % Nonblack Drivers (unmatched) (N=3,033) |
|---|---|---|---|
| Region | | | |
| East | 32% | | 14% |
| Hills | 1% | | 3% |
| ⋮ | | | |
| Time of Day | | | |
| 12AM-4AM | 16% | | 7% |
| ⋮ | | | |
| Age | | | |
| 18-29 | 47% | | 38% |
| ⋮ | | | |
| Reason | | | |
| Mechanical/ Registration | 26% | | 16% |
| ⋮ | | | |

# *Propensity Score Analysis Created Comparison Group in Terms of Stop Features*

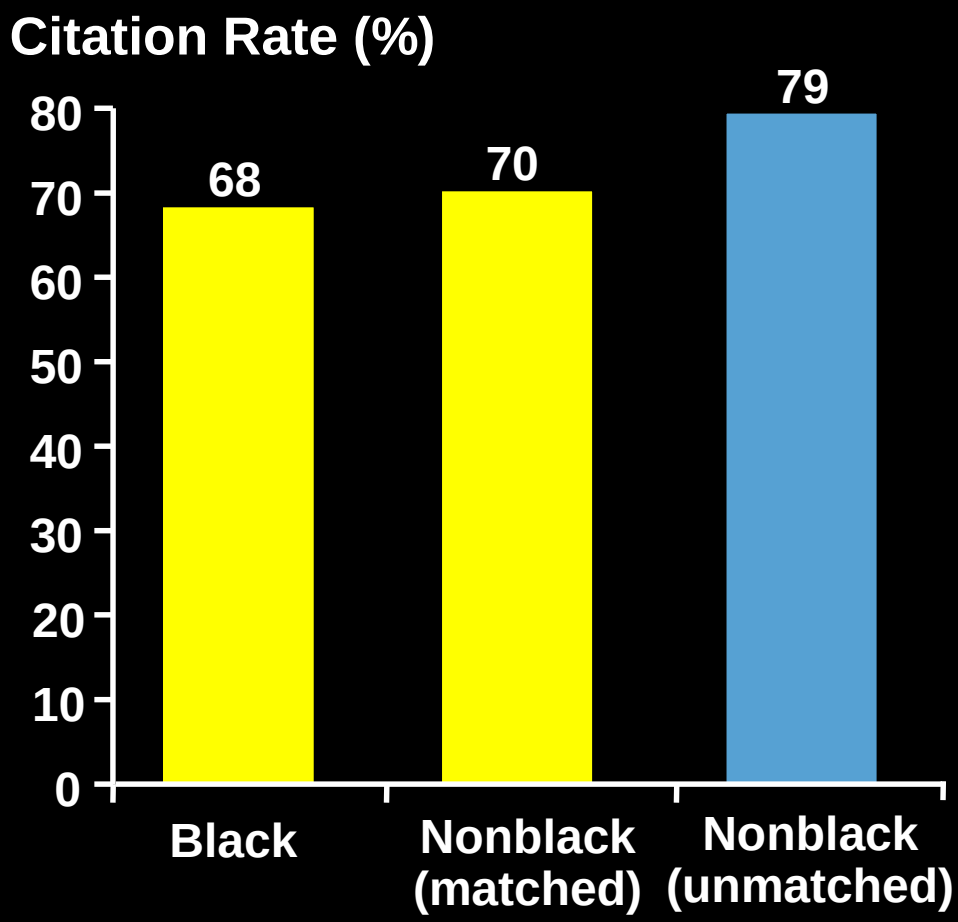
| Stop Feature | % Black Drivers (N=3,703) | % Nonblack Drivers (matched) (N=1,689) | % Nonblack Drivers (unmatched) (N=3,033) |
|---|---|---|---|
| Region | | | |
| East | 32% | 33% | 14% |
| Hills | 1% | 1% | 3% |
| ⋮ | | | |
| Time of Day | | | |
| 12AM-4AM | 16% | 16% | 7% |
| ⋮ | | | |
| Age | | | |
| 18-29 | 47% | 48% | 38% |
| ⋮ | | | |
| Reason | | | |
| Mechanical/ Registration | 26% | 26% | 16% |
| ⋮ | | | |

# *Analysis Shows That a Race Disparity in Citation Rates Might Exist*




- **Citation rate for black drivers is 2% less than for comparable non-black drivers**

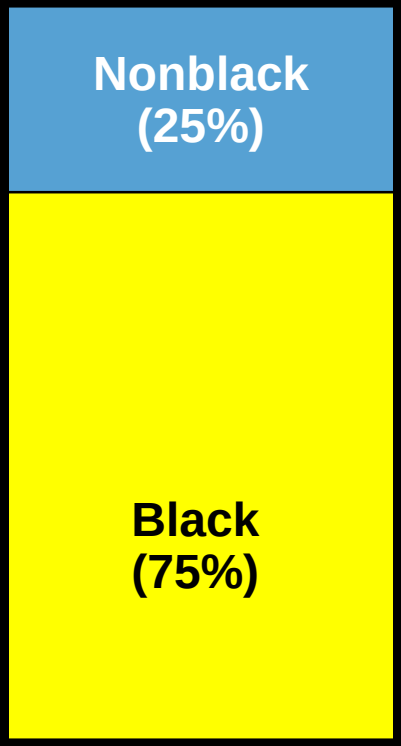
# *But the Analysis Also Shows the Danger of Making Naïve Comparisons*



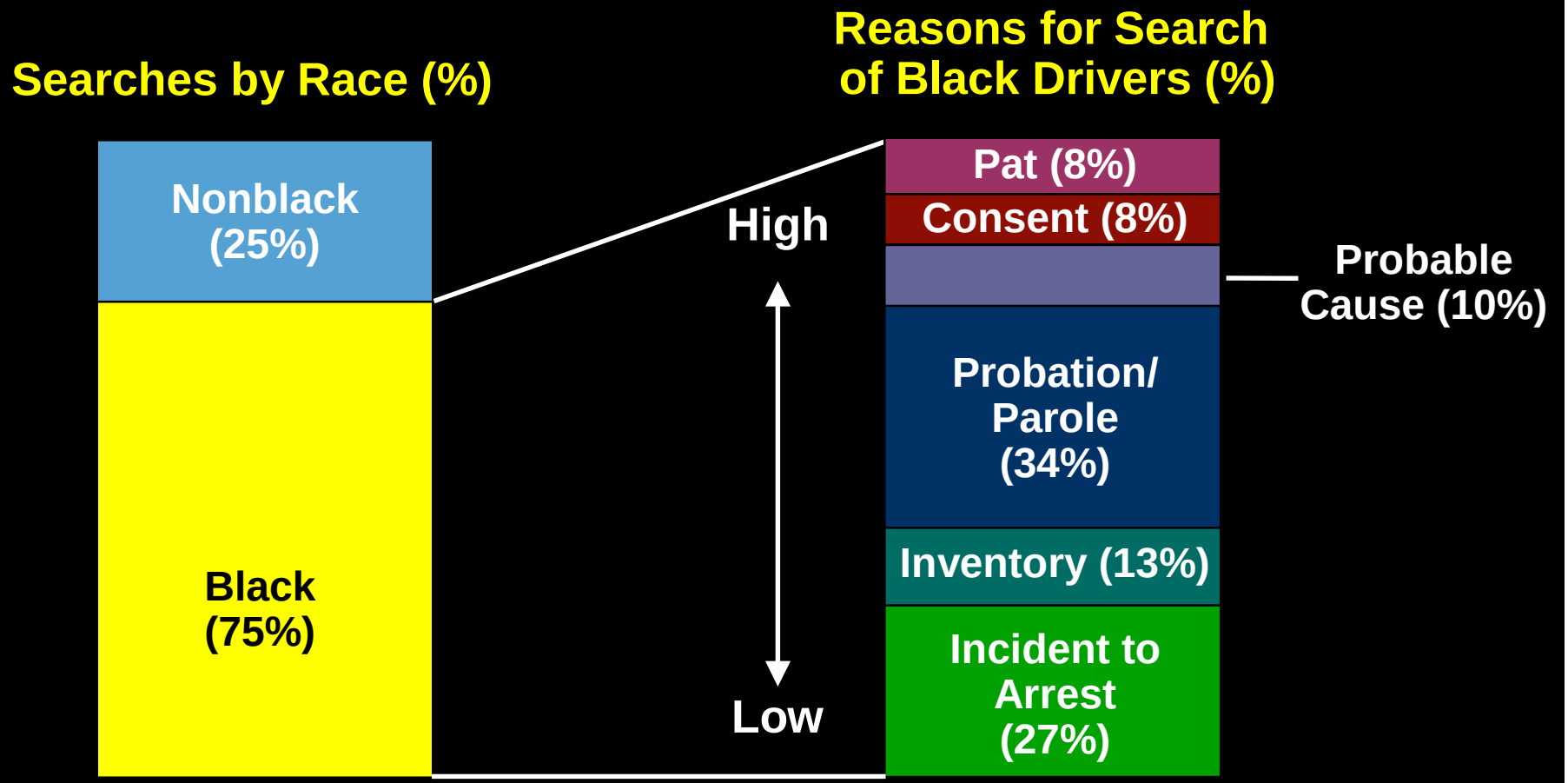

- When we compare black vs. nonblack (unmatched), difference is 11%
- Logistic regression gives an adjusted citation rate of 72%

# *Black Drivers Bear the Burden of Searches*

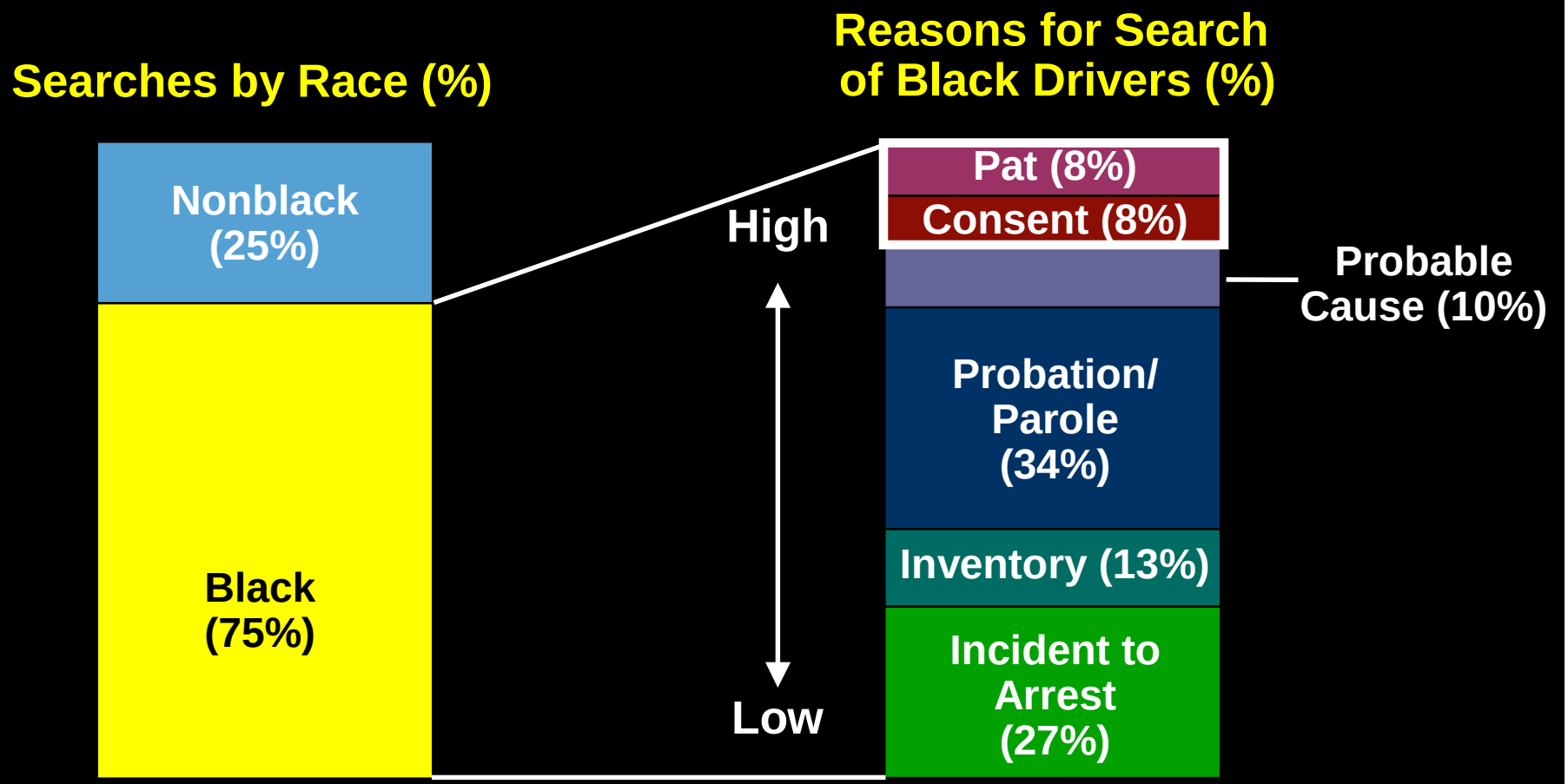
**Searches by Race (%)**



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

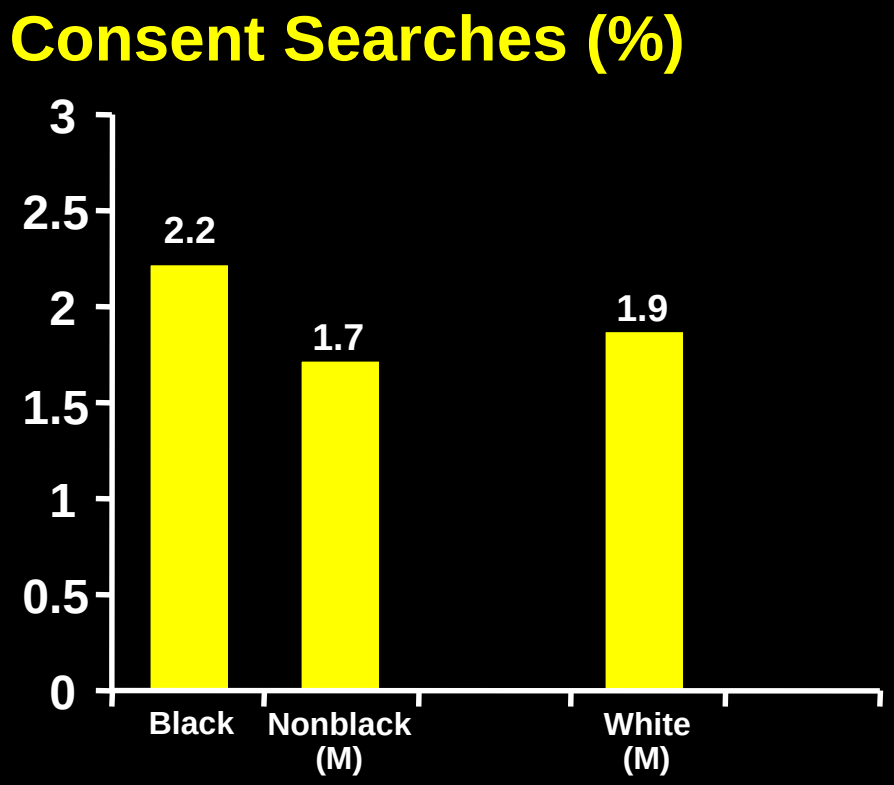


# *Black Drivers Bear the Burden of Searches but Most Searches Are Low-Discretion Ones*



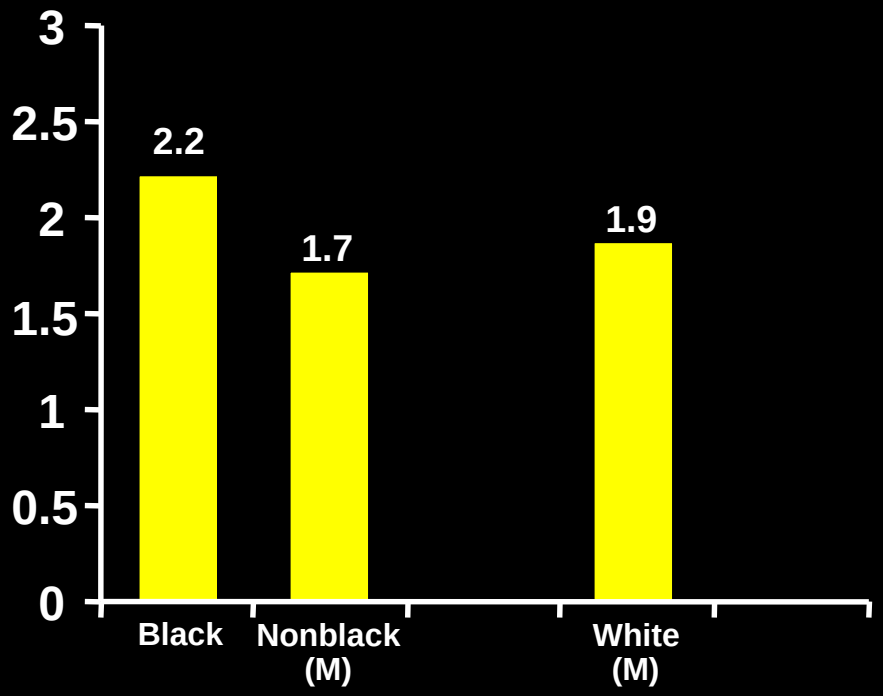

***We focus on pat and consent searches***

# *Consent Searches Have Similar Rates*

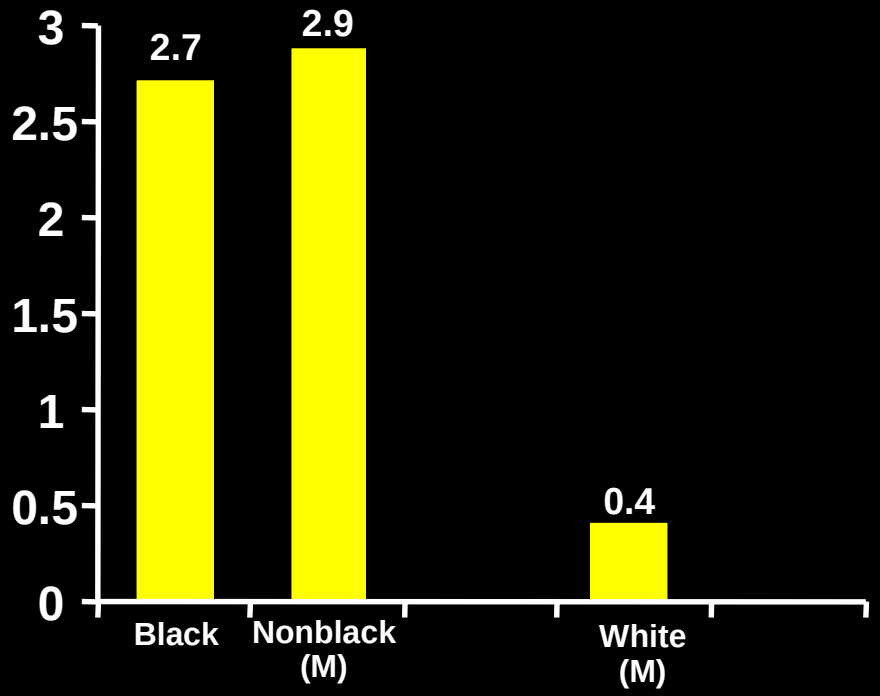


# *Consent Searches Have Similar Rates, but Pat Searches More Likely for Blacks Than Whites*

## Consent Searches (%)

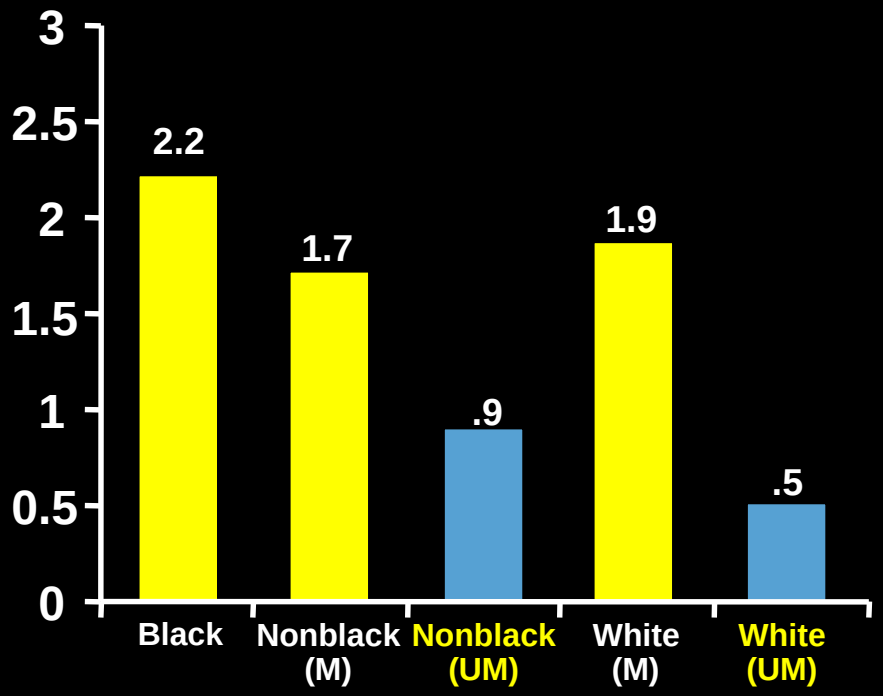



## Pat Searches (%)

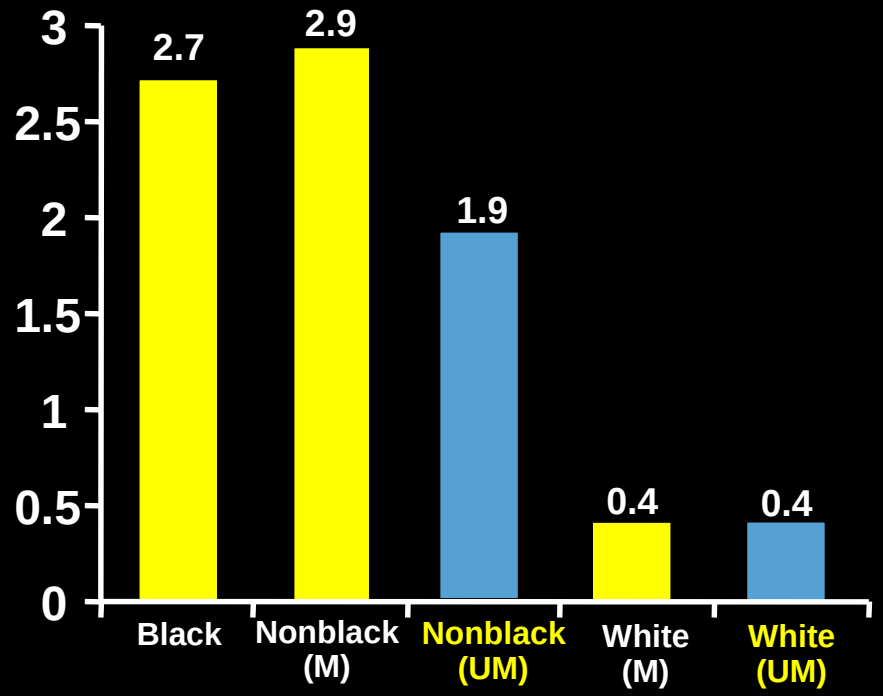


# *Once Again, Naïve Comparisons Can Distort the Findings*

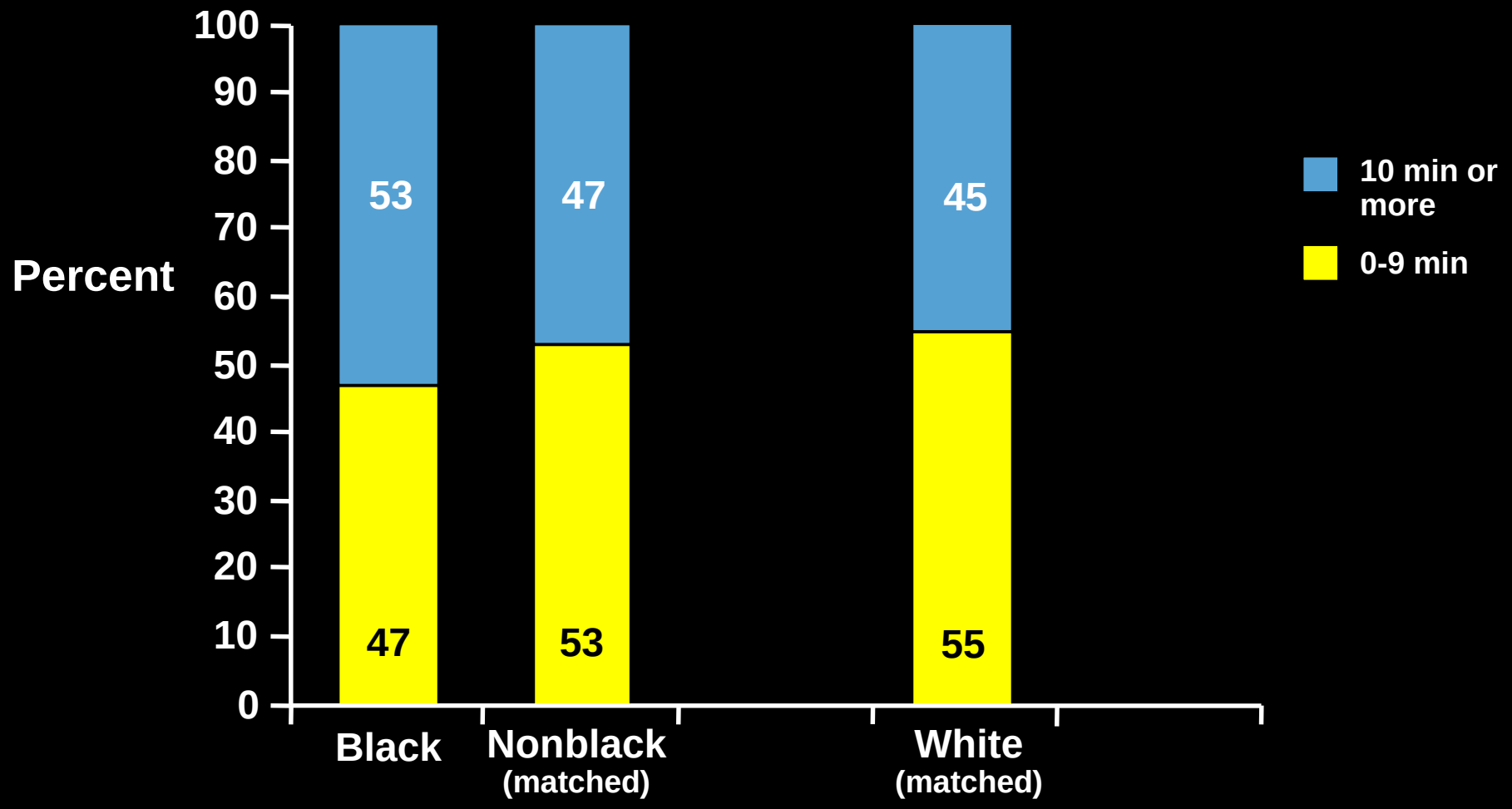
## Consent Searches (%)




## Pat Searches (%)

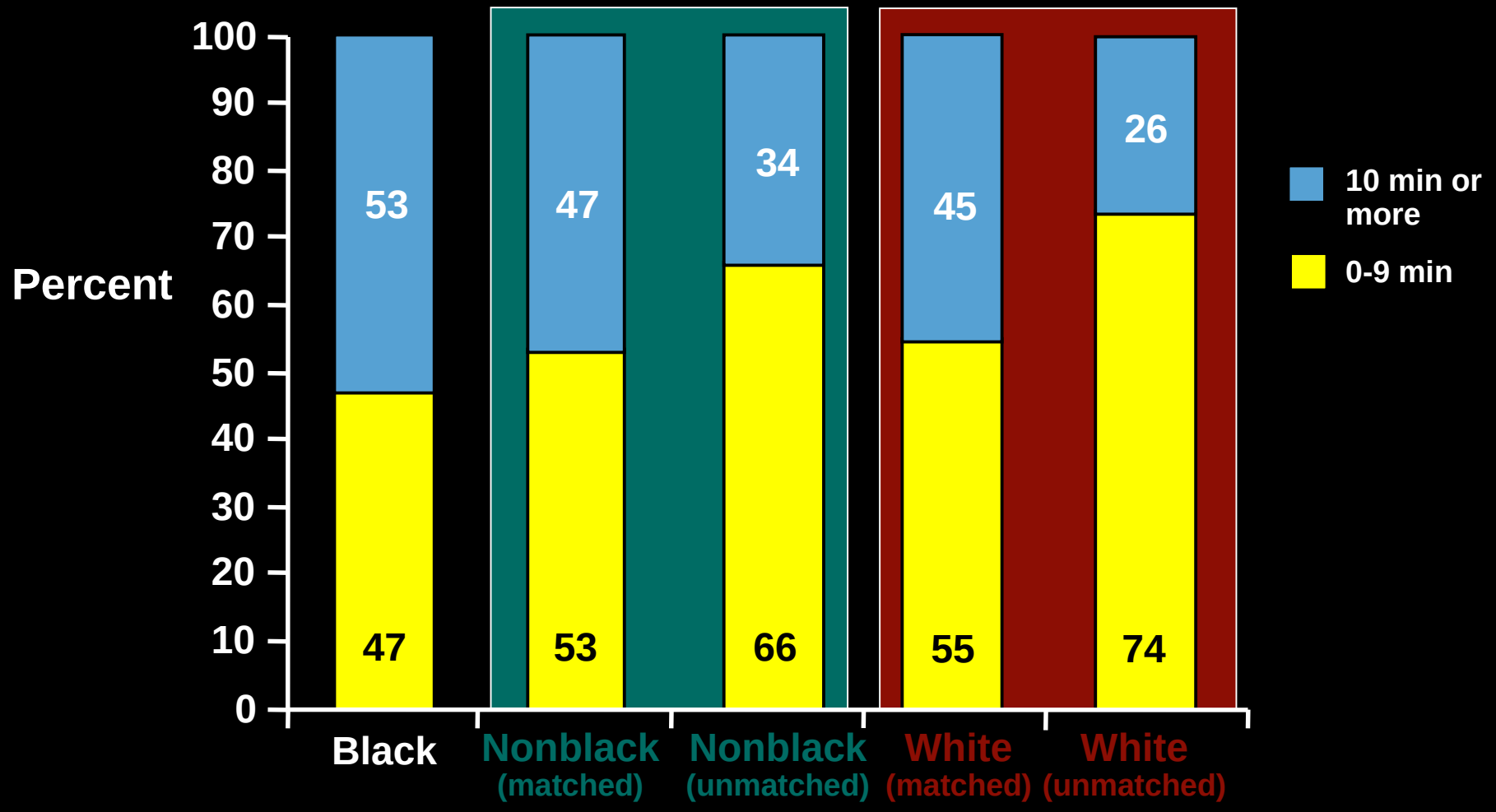


# Black Drivers Seemed More Likely to Have Longer Stops Than Non-Black or White Drivers




RAND

# *Naïve Comparisons Considerably Overstate the Problem*




RAND

# *Summary: Is There a Race Bias in Oakland?*

- **Citations**: Small differences in citation rates
- **Search**: Frequency of pat searches is greater among black drivers than against similarly situated white drivers
- **Duration**: Black drivers are more likely to be detained for more than 10 minutes than similarly situated drivers

# *Methodological Conclusions*

- **Naïve methods can exaggerate (or even understate) the effect of racial bias**
- **Multivariate regression does not work when the race groups differ greatly in stop features**
- **Propensity score weighting**
  - **balances the groups on all observed features**
  - **Model diagnosis is transparent**
  - **Results are easy to present to community members and police officers**


INFRASTRUCTURE, SAFETY,
AND ENVIRONMENT