

Demographic Analysis of Arrest-Related Deaths in the US



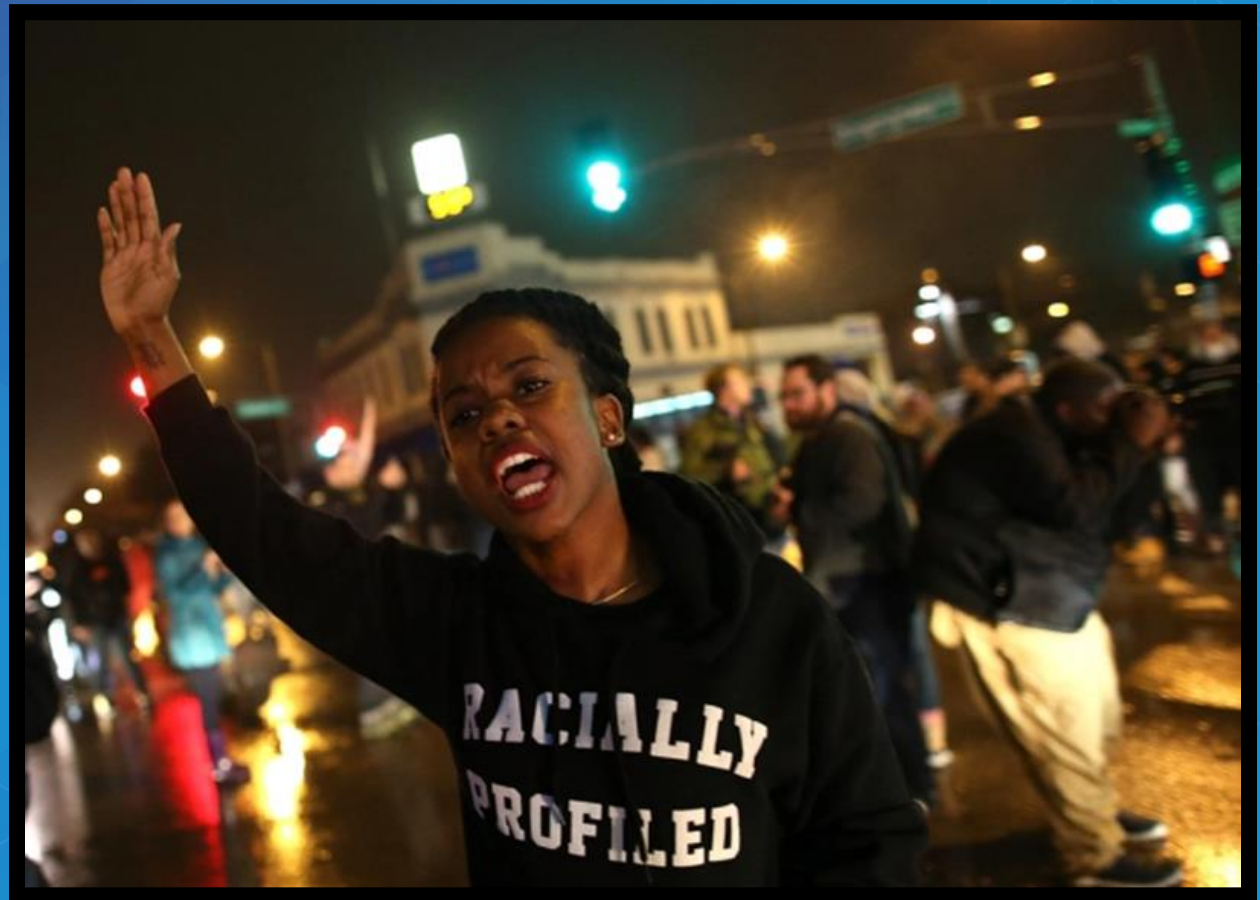
Nicholas Blaney

Asish Satpathy

School of Business Administration, University of California - Riverside

Outline

- Motivation
- Hypotheses
- Dataset
- Results
- Conclusion
- Outlook



A New Normal?

- An arrest-related death (ARD) transpires “when the event causing the death occurs during an interaction with ... law enforcement personnel” (“Arrest-Related Deaths”, 2016).
- We seek to gain insight regarding the prevalence of ARDs in the United States.



Disclaimer



- The data used in this paper does not prove justification, or wrongdoing, of lethal force by the officer. The data solely indicates the death of an individual.
- We assume that all publicly available data used for this analysis have been tested for accuracy.

Research Questions

- **# 1: Are community demographics a factor to the prevalence of ARDs?**
- **# 2: Do the demographics of the community surrounding an ARD incident relate to the deceased's race?**
- **# 3: Do the contiguous community's demographics have any relationship with the deceased's age or armed status?**



Hypotheses

- **# 1: Income disparity, racial diversity, and the unemployment rate have a significant effect on the incidence of ARDs in a community**
- **#2: Given hypothesis #1 is true, then higher levels of income disparity, racial diversity, and unemployment will increase the likelihood of a colored person being killed**
- **#3: If hypothesis #1 is true, then higher levels of income disparity, racial diversity, and unemployment will increase the likelihood of an unarmed person of color being killed**

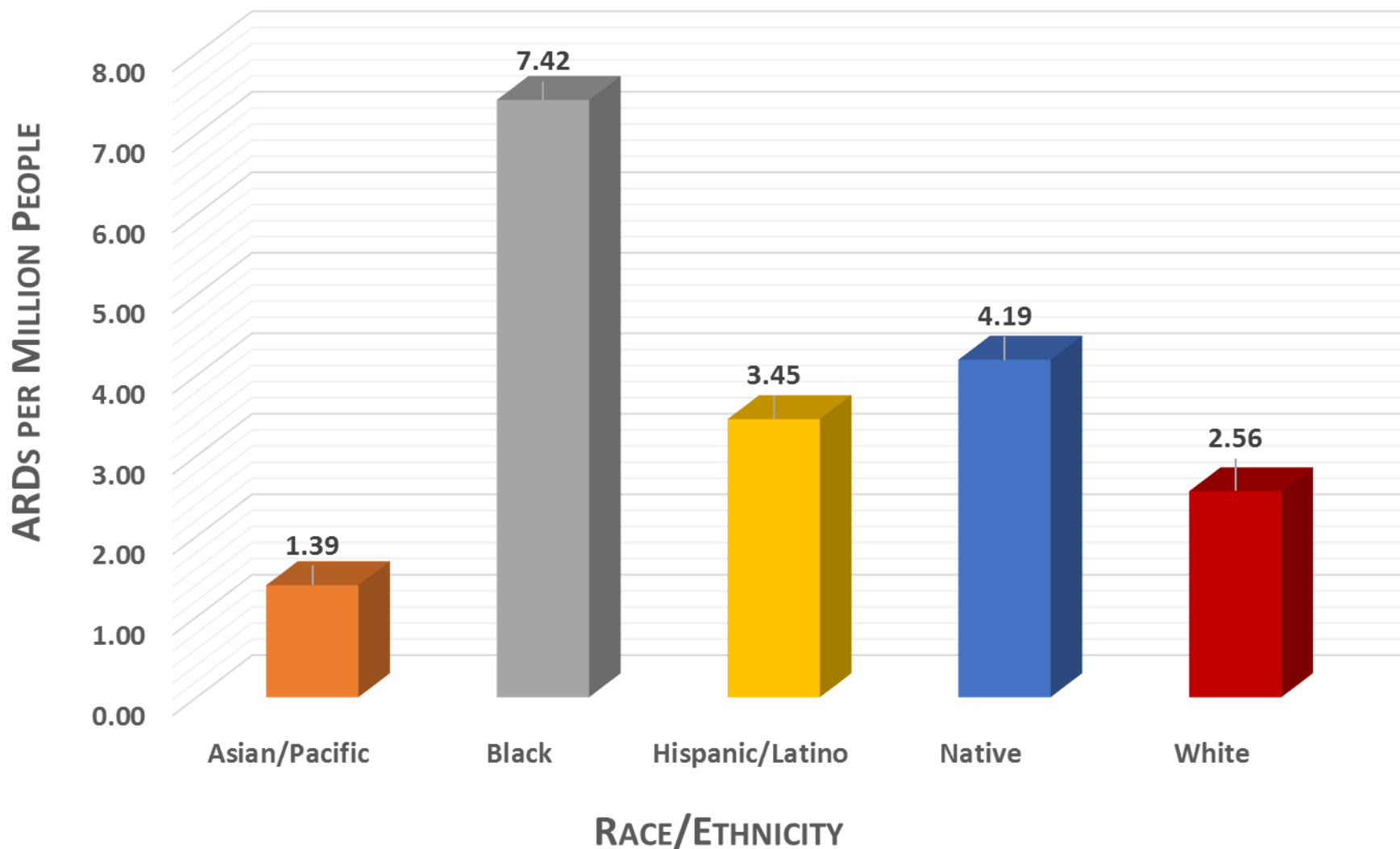


The Data: “The Counted”

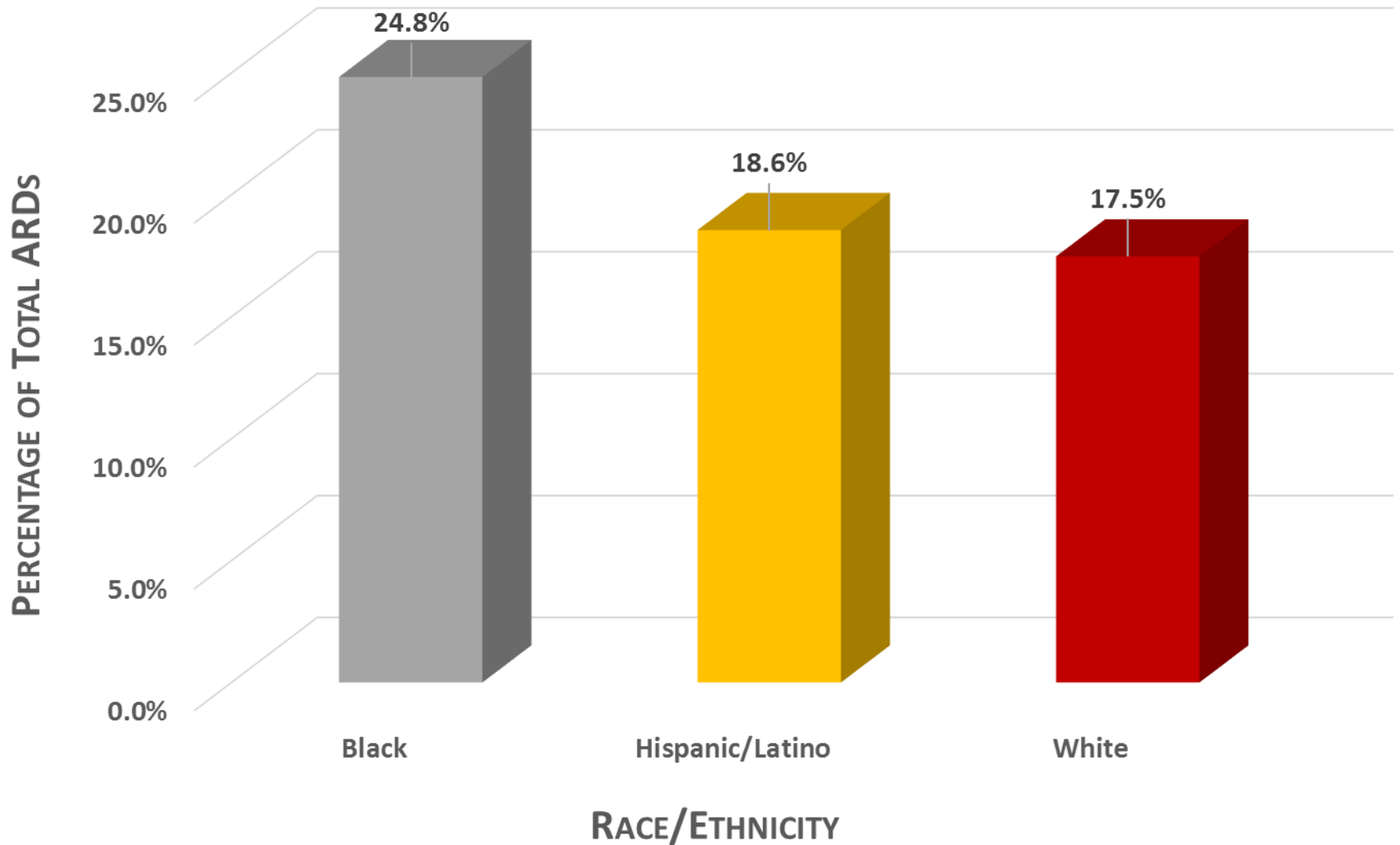
- **The Guardian Newspaper:**
 - **Date acquired: January 15, 2016**
 - **1138 occurrences over the year 2015**
 - **Excluded entries where missing data entry was required for analysis**
 - **Self-inflicted deaths are not included in this dataset.**
- **Information included**
 - **Deceased’s name, age, gender, race, cause of death, armed status.**
 - **Date, street address, city, and state of the incident**
 - **Law enforcement agency involved**

[Dataset Download](#)

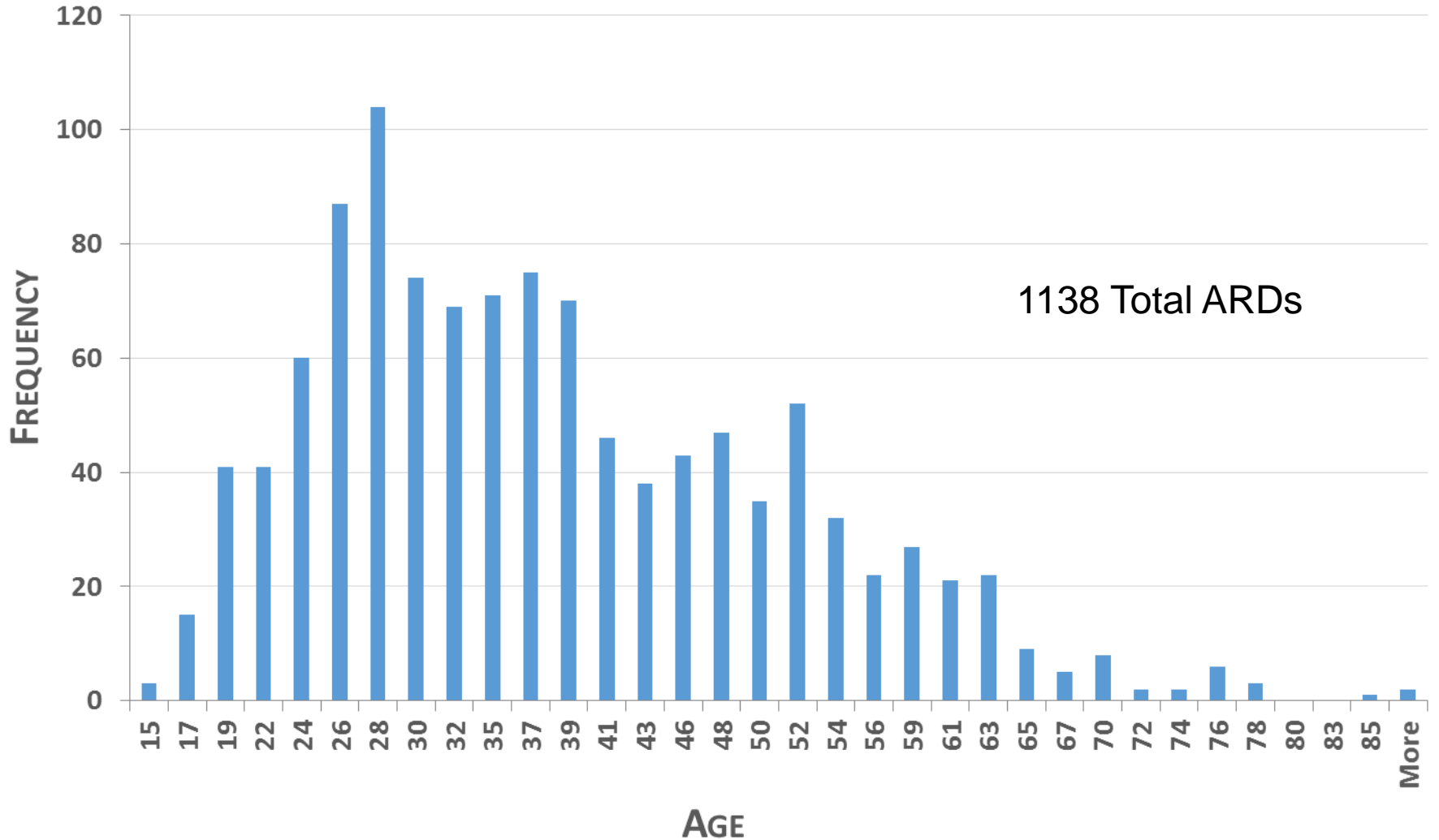
ARDs, Adjusted for Population



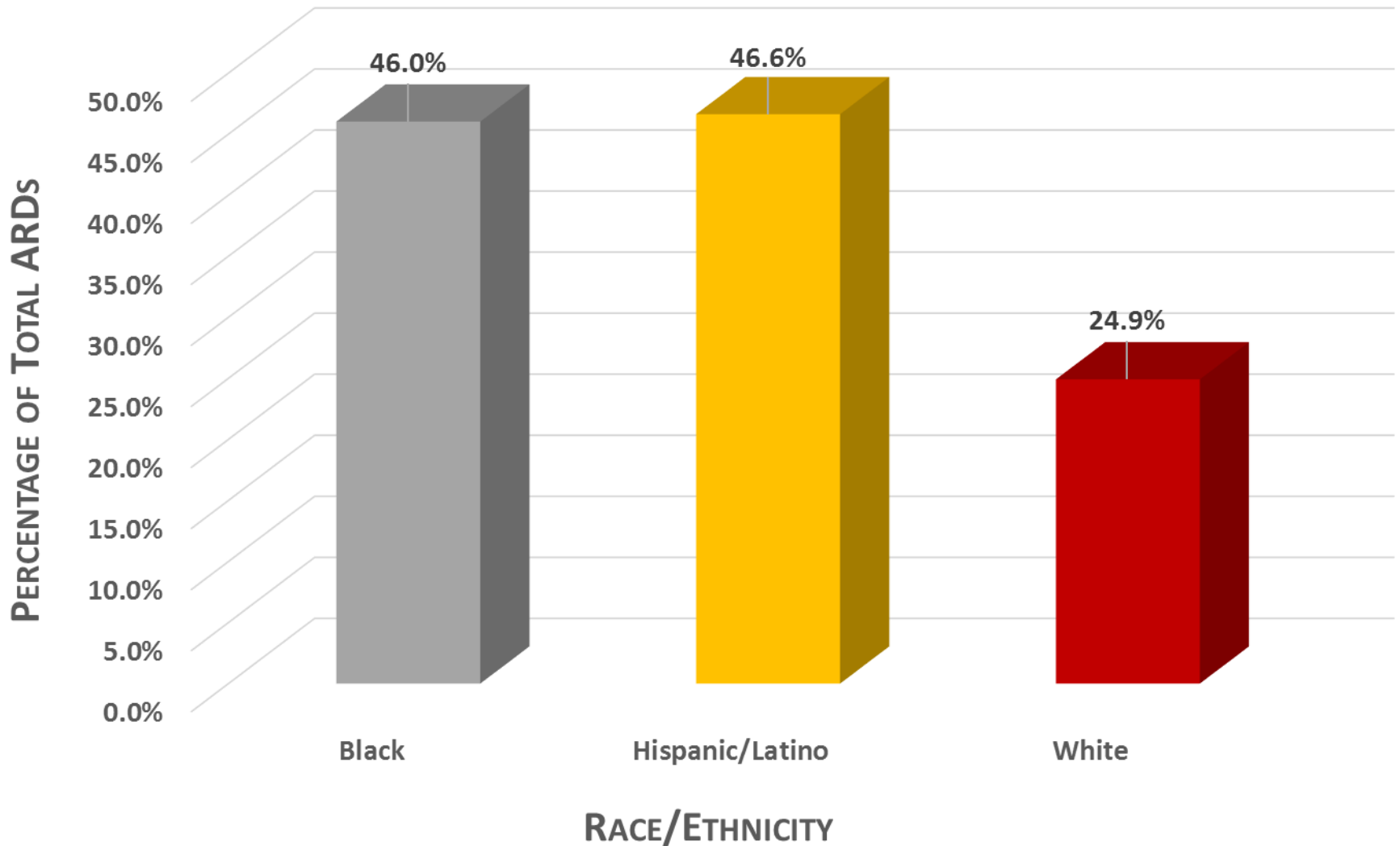
($\frac{\text{Unarmed ARDs}}{\text{Total ARDs}}$)



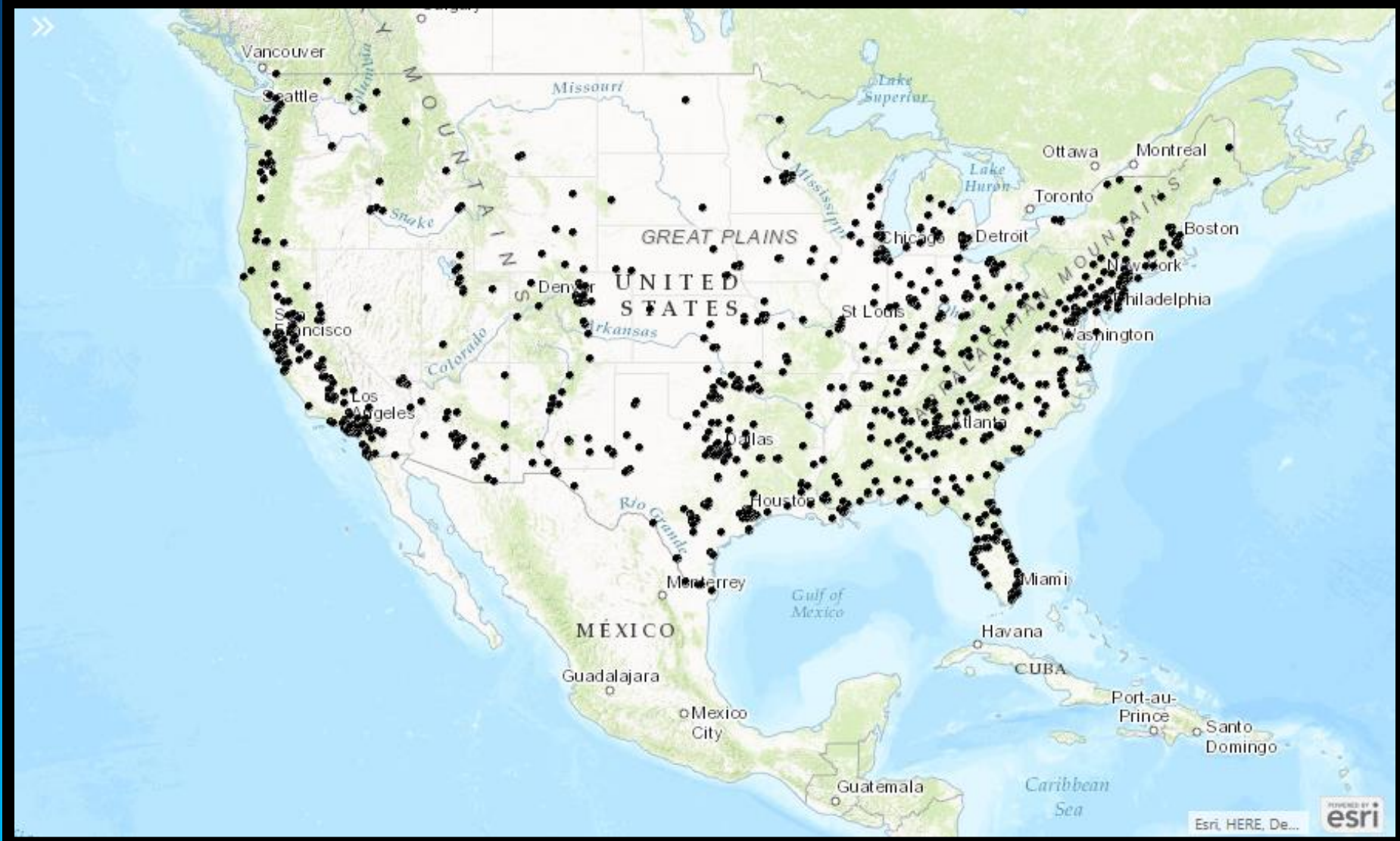
Age Distribution of ARDs



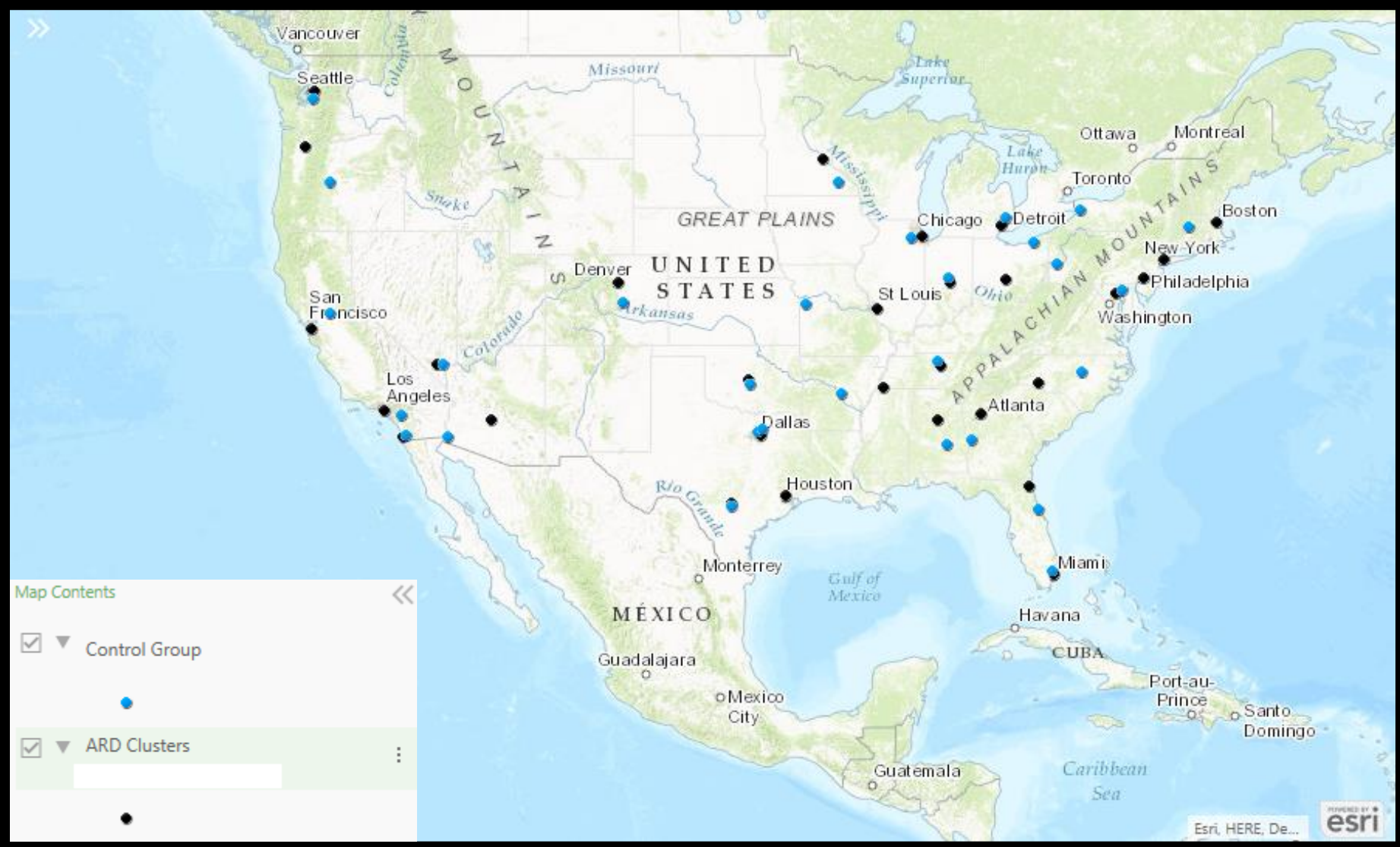
(ARDs of Suspects Under 30 Year Olds) Total ARDs



“The Counted” ARDs



ARD Clusters & Control Groups



Data Definition - I

- Racial Diversity Gap (RDG)

$$\frac{(\textit{White Population} - \textit{Non-White Population})}{\textit{Total Population}}$$

- Income Disparity Gap (IDG)

$$\frac{(\textit{Low Income Households} - \textit{High Income Households})}{\textit{Total Number of Households}}$$

Data Definition - II

- Educational Spending per Household (ES/HH)

$$\frac{\text{Educational Spending}}{\text{Total Number of Households}}$$

- Educational Spending as a % of Household Income (ES%I)

$$\frac{\text{Educational Spending}}{(\text{Average Household Income} * \text{Total Number of Households})}$$

Data Definition - III

- Alcohol Consumption per Household (AC/HH)

$$\frac{\text{Alcoholic Beverages}}{\text{Total Number of Households}}$$

- Alcohol Consumption as a % of Household Income (AC%I)

$$\frac{\text{Alcoholic Beverages}}{(\text{Average Household Income} * \text{Total Number of Households})}$$

Results - I

Group	p-value
Median HH	<.0001
IDG	0.0079
AC/HH	0.2745
ES/HH	0.3855
AC%I	<.0001
ES%I	0.0002
RDG	0.0011
UR	0.1728

Note: IDG = Income Disparity Gap; HH = household; AC = alcohol consumption; ES = educational spending; %I = as a percentage of household income; RDG = Racial Diversity Gap; UR = Unemployment Rate

Results - II

Group	p-value
IDG	<.0001
AC%I	0.0067
ES%I	0.0579
RDG	<.0001
UR	<.0001

Race	Predictor	p-value	Exp (B)*
Black	IDG	<.0001	1.014
Hispanic	IDG	0.1734	1.005
Black	AC%I	0.2270	1.755
Hispanic	AC%I	0.0017	5.140
Black	ES%I	0.1508	1.211
Hispanic	ES%I	0.0243	1.413
Black	RDG	<.0001	0.968
Hispanic	RDG	<.0001	0.979
Black	UR	<.0001	1.141
Hispanic	UR	0.0006	1.084

Note: Log odds for
Black/White &
Hispanic/White

Results - III

Age \geq 30

Group	B	H	W	p-value
IDG	a	ab	b	0.0001
AC%I	ab	a	b	0.0192
RDG	a	b	c	<.0001*
UR	a	a	b	<.0001

Age < 30

Group	B	H	W	p-value
RDG	a	b	c	<.0001*
UR	a	b	b	0.0003

Only significant variables are shown

Note: * indicates using Welch t-test due to assumption of homogeneity of variance being violated based on $p < 0.05$ Brown-Forsythe.

Differing letters across rows indicate statistically significant differences of means based on $p < 0.05$ Fisher's LSD or Games-Howell post hoc analysis.



Results - IV

Armed

Group	B	H	W	p-value
IDG	a	a	b	<.0001
AC%I	ab	a	b	0.0418
RDG	a	b	c	<.0001*
UR	a	b	c	<.0001

Unarmed

Group	B	H	W	p-value
RDG	a	b	c	<.0001*

Only significant variables are shown

Note: * indicates using Welch t-test due to assumption of homogeneity of variance being violated based on $p < 0.05$ Brown-Forsythe.

Differing letters across rows indicate statistically significant differences of means based on $p < 0.05$ Fisher's LSD or Games-Howell post hoc analysis.



Takeaways

- **Our research suggests that income disparity and the racial diversity gap are statistically significant factors for the occurrence of ARDs**
- **We infer when demographic factors such as income disparity, alcohol consumption, educational spending, and unemployment rate increases, the odds of a colored person being killed increases. As the racial diversity gap decreases, the odds of a person of color being killed increases**



Conclusion

- We discovered a few location-based variables with a significant effect on ARD incidents
- Some of them were intuitive, while others were not
 - Needs further investigation with more data



Recommendations

- Using the variables we identified it is possible to find vulnerable areas where law enforcement might require
 - Increased sensitivity training
 - Increased training in conflict de-escalation
 - Modifying policing policies
 - Changes in police culture



Outlook

- **Further studies can use additional variables**
 - **Crime index, people sentiments (thorough sentiment analysis)**
- **Qualitative research**
 - **Investigate the circumstances surrounding individual ARD incidents**
 - **Focus on the communities where unjustified/disputed deadly forced is used**
- **As more ARD data becomes available, time-based analysis would be interesting**



All Lives Matter.

Questions?