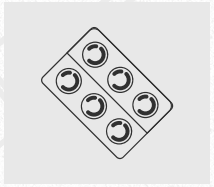
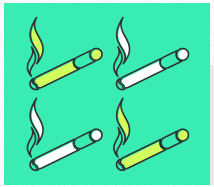
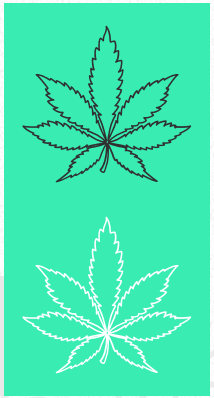




Estimate the Impact of Opioid Control Policies



Beibei Du, Wafiakmal Miftah, Suzanna Thompson, Alisa Tian

Overview of Presentation

01 Motivation

02 Overview of Data

03 Methods & Analysis

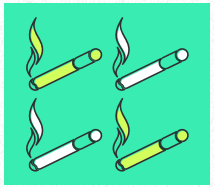
04 Interpretations & Results

05 Discussion

06 Future Work

“"The drugs won't make you happy, they will only make you numb. You need to find happiness within yourself or you'll never find it.”

—Chester Bennington



01 Motivation

A Data-Driven Approach to Addressing the Opioid Epidemic

Timeline of Opioids

1800s

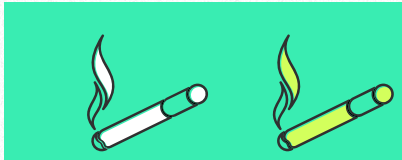
Early 1900s

→ Opioids were commonly used for medical purposes

Mid 1900s → Synthetic opioids are created

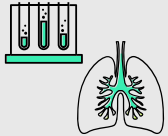
1990s → Opioids → pain reliever → overdose death

After 1990s → Non-prescription opioids increased (illegal)

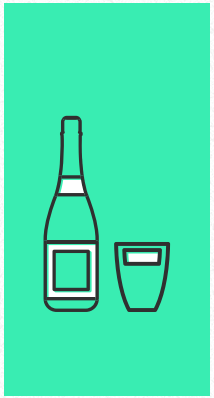


INTRODUCTION

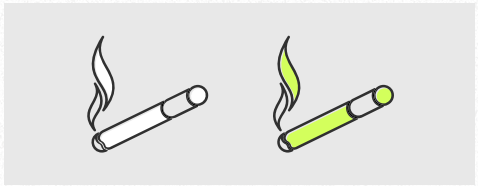
Opioid overdose usage is a devastating health concern to the communities across the United States. Implementing policies to decrease access to these drugs could be one of the solutions to combat the opioid overdose crisis.



02 Overview of Data



A Data-Driven Approach to Addressing the Opioid Epidemic



Dataset

1. **Opioids Prescription/Shipment data (Washington Post):**

This dataset holds all the information of the opioids prescription across the years in all states in the United States (about 100Gb). We select three states and their controlled states to preprocess, and sum all the data of all counties in a state and take that into our analyses.

The unit of observation for this dataset is at the county level.

2. **Mortality Rate data (CDC Wonder):**

This dataset includes state, county, year, opioid-related cause of death and the number of deaths per county and state.

The unit of observation for this data is at the county level.

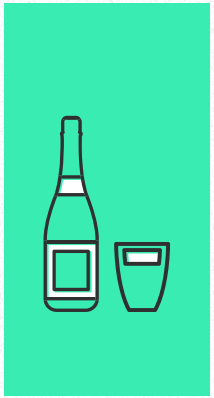
3. **Population data (CDC Wonder):**

CDC is a reliable system for holding public health data and information across the United States.

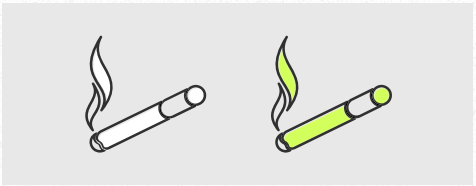
Dataset: Cleaning

1. Merging Datasets
2. Reduce size of Shipment Dataset
3. Missing Counties
    a. Imputing ‘Death’ counts with 5

03 Methods & Analysis

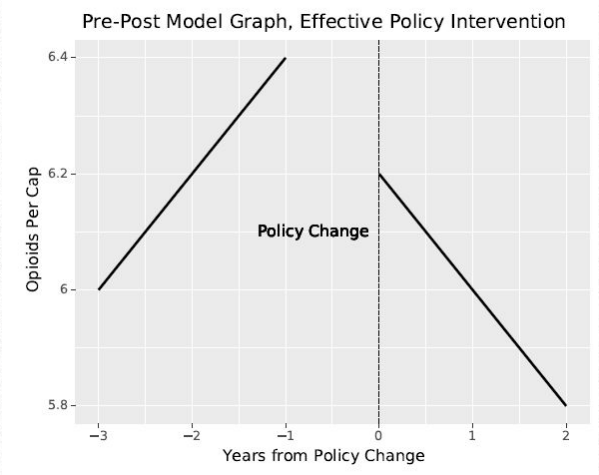


A Data-Driven Approach to Addressing the Opioid Epidemic

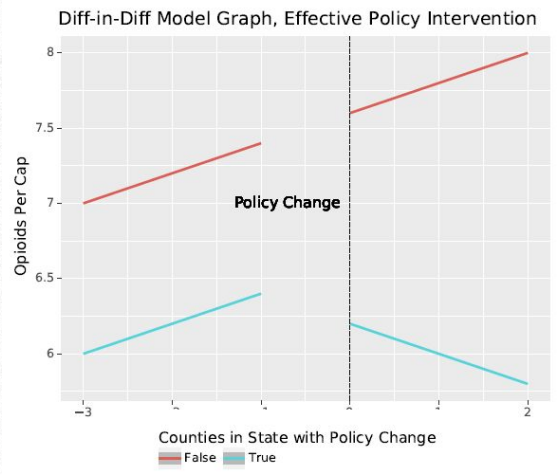


Types of Analysis

Pre-Post Analysis (Example)

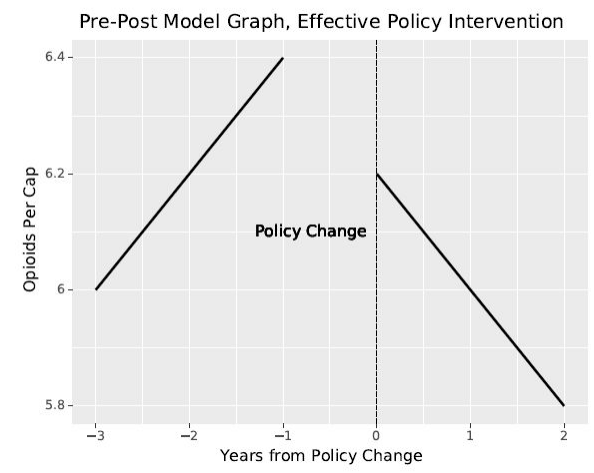


Difference-in-Difference Analysis (Example)



Pre-Post

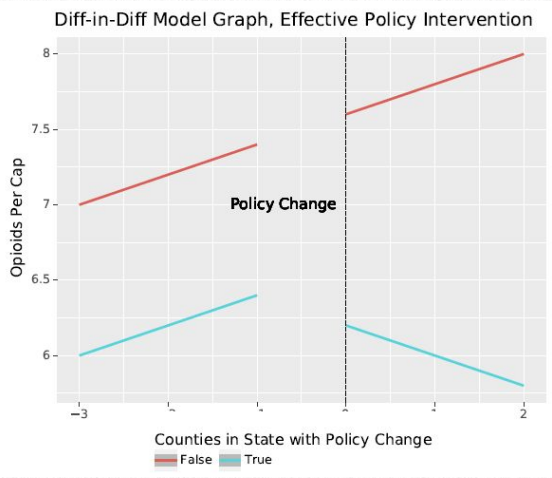
Pre-Post Analysis (Example)



Gives us a way to see how the trend changes over time

Difference in Difference

Difference-in-Difference Analysis (Example)



Gives us a way to see how the trend changes over time, in comparison to an approximate control.

Answers the question: Would this have happened without a policy change treatment?

Choosing Control States

Goal:

Choose States that have similar shipment and death rates, as well as other socioeconomic characteristics.

Choosing Control States: Why?

Socioeconomic characteristics we're considering:

- Education
- Income
- Population

- We want to control for any confounding variables.
  - Less affluent & educated communities are more susceptible to addiction and overdose

Choosing Control States: Why?

Similarity Score:

$$Similarity_{Income,\ AR\ vs\ FL} = Income_{Arkansas} \div Income_{Florida}$$

Bounds:

$$80\% \leq Similarity\ Score \leq 120\%$$

Missing Policies

State alcohol and drug agency initiatives to address opioid abuse, by state, based on National Association of State Alcohol and Drug Abuse Directors questionnaire,[a] May 2015

State	Education on Risks of Opioids				Education on Prescribing of Opioids[b]			Good Samaritan Law[g]	Funding for MAT[h]
	General Population[c]	Adolescents[d]	Women[e]	Older Adults[f]	Physicians and Other Prescribers	Patients and Families	Pharmacists		
AL	✓	✓			✓				✓ M, S
AK									
AZ	✓	✓		✓	✓	✓	✓		
AR	✓							✓	
CA	✓				✓		✓		✓ M
CO	✓	✓			✓				✓ M, S
CT	✓	✓						✓	
DC	✓							✓	✓ M, S
DE	✓	✓			✓	✓	✓	✓	✓ S
FL	✓	✓	✓	✓					✓ S
GA	✓	✓				✓		✓	✓ S
HI	✓							✓	
ID	✓	✓			✓	✓	✓		

Source: "*How States are Tackling the Opioid Crisis*," Wickramatilake et. al., 2017

Choosing Control States: Results

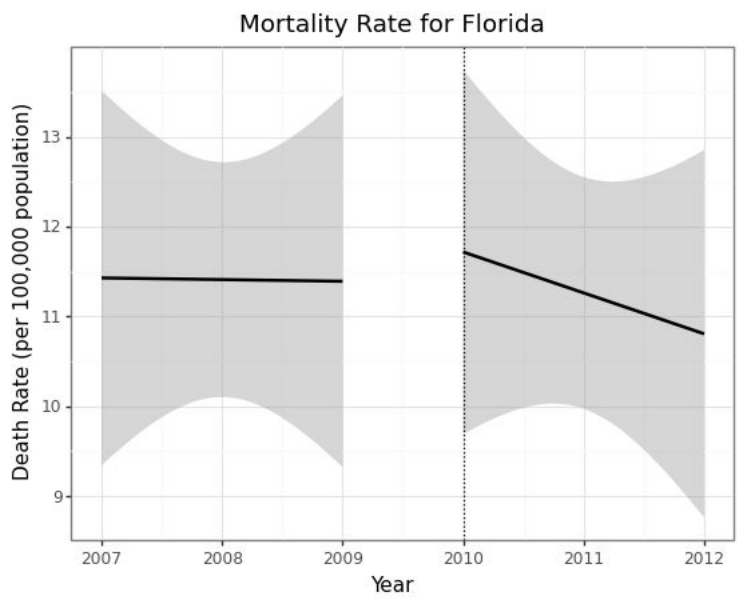
Treatment State	Control States
Texas	Arkansas, California, Georgia, Missouri, New York, Wyoming
Washington	Hawaii, Iowa, Kansas, Maine, Massachusetts, Minnesota, Montana, Nebraska, North Dakota, Oregon, South Dakota, Virginia, and Wyoming
Florida	California, Nevada, New York

04 Interpretations & Results

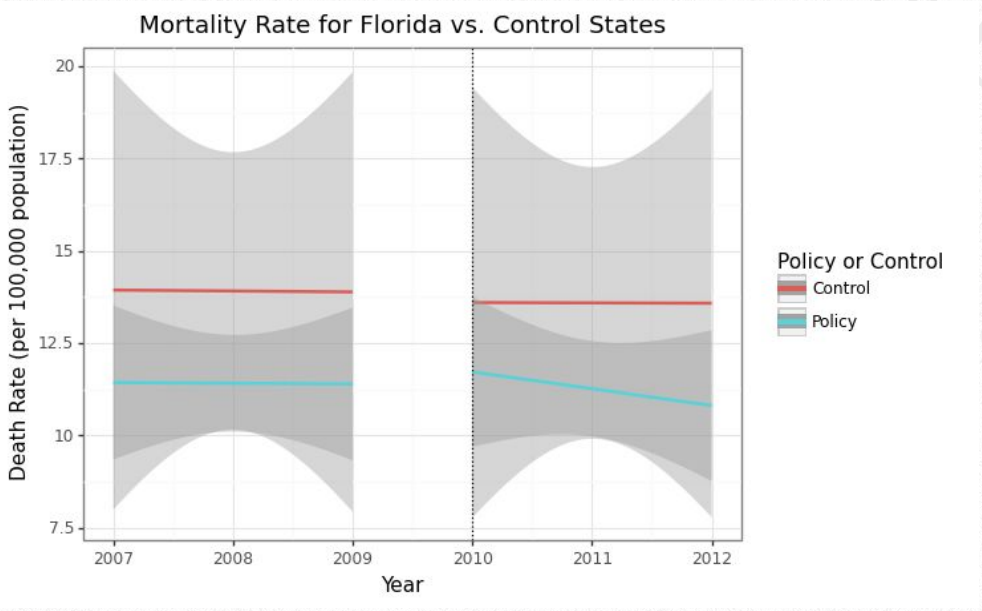
A Data-Driven Approach to Addressing the Opioid Epidemic

Mortality: Florida

Pre-Post Analysis

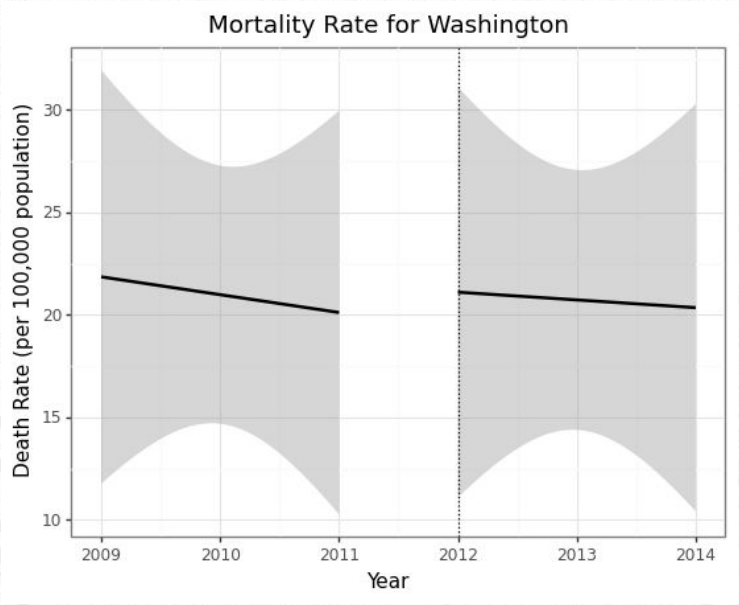


Difference-in-Difference Analysis

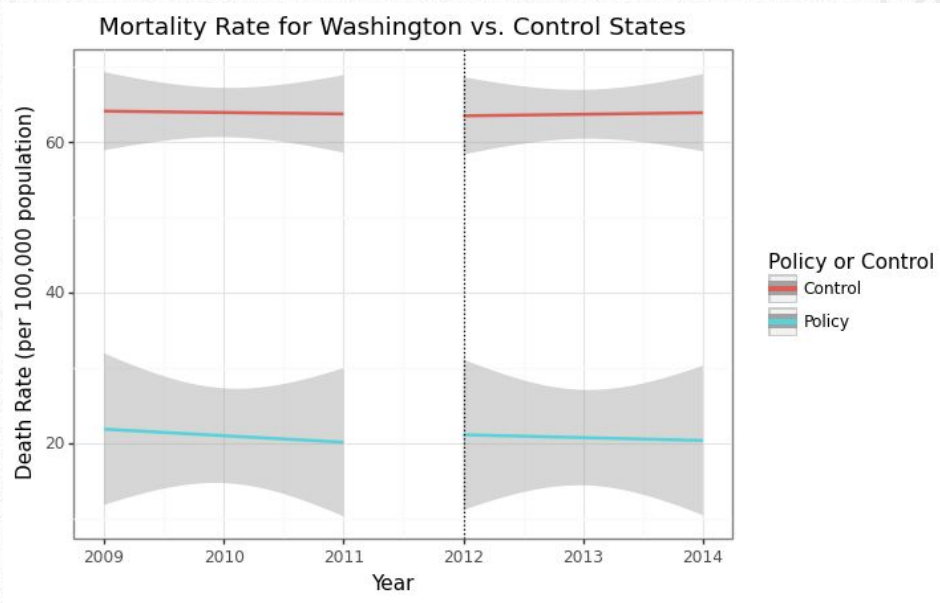


Mortality: Washington

Pre-Post Analysis

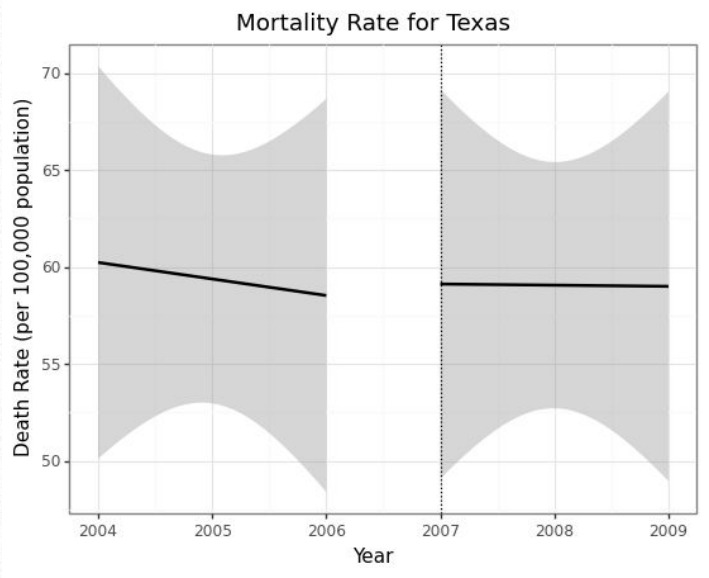


Difference-in-Difference Analysis

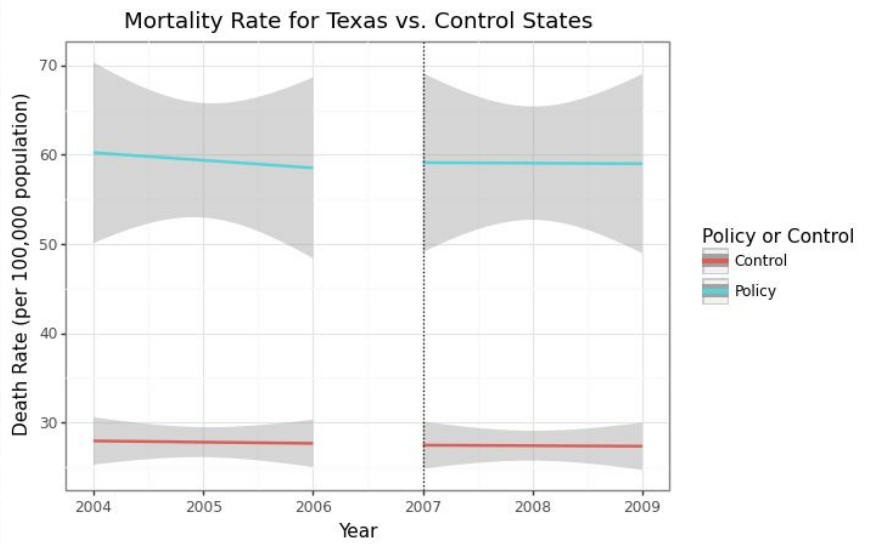


Mortality: Texas

Pre-Post Analysis

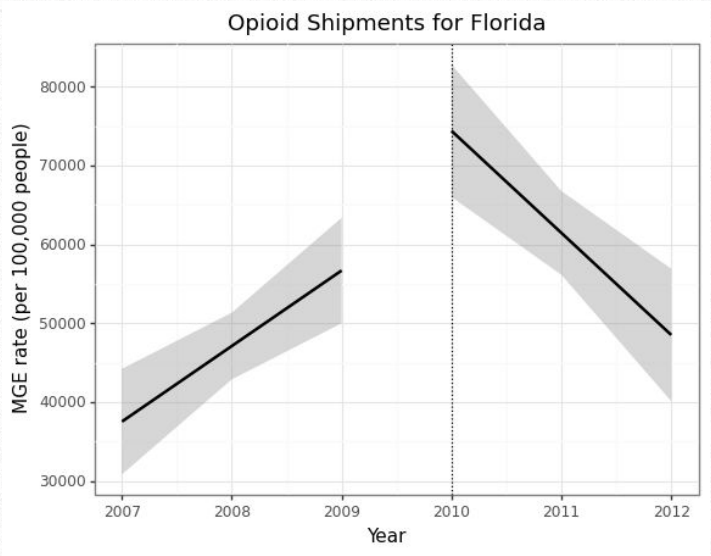


Difference-in-Difference Analysis

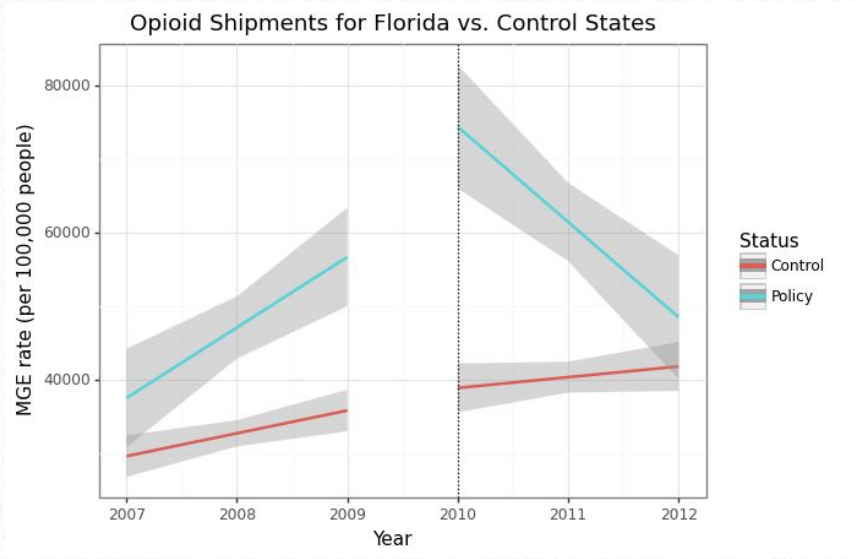


Prescription and Shipment: Florida

Pre-Post Analysis

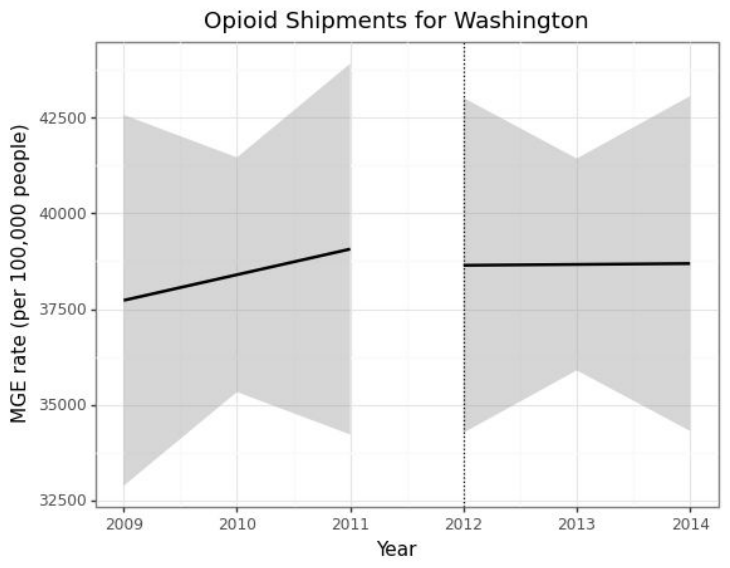


Difference-in-Difference Analysis

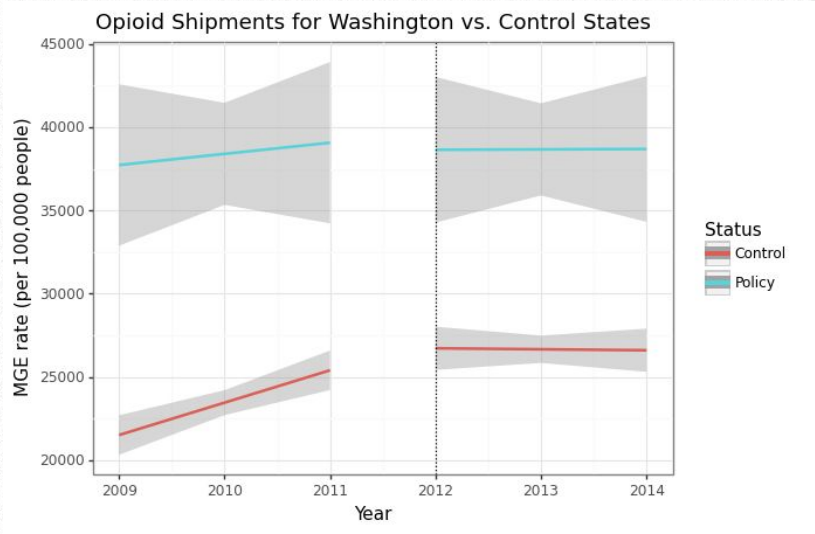


Prescription and Shipment: Washington

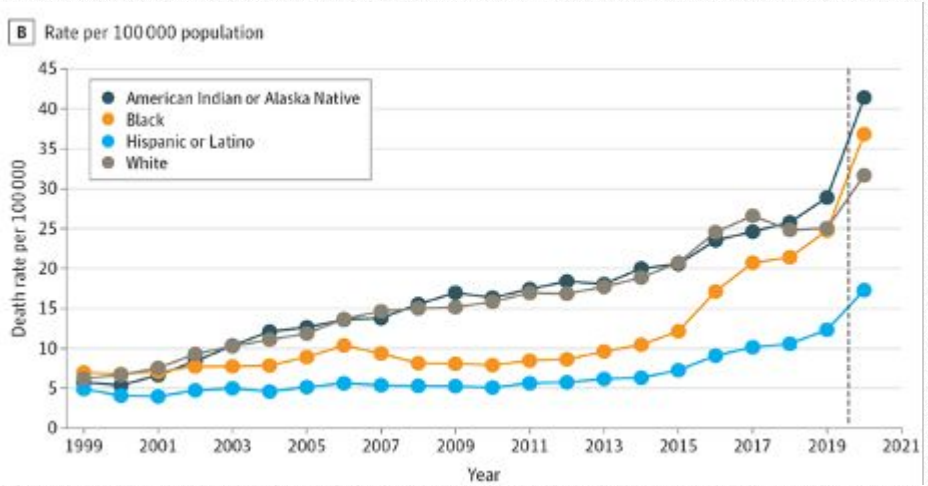
Pre-Post Analysis



Difference-in-Difference Analysis



05 Discussion



DISCUSSION SUMMARY

Research shows that many providers in the healthcare system have an implicit bias against people of color. This means that our the treatment-related policy implementations may disproportionately help white people over POC. Recent analysis shows that the overdose rate for people of color is growing quicker than that for white people.

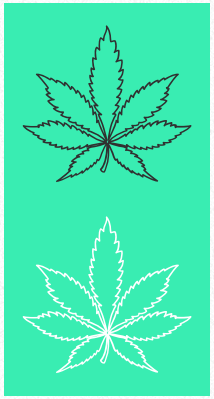
Source: "*US drug overdose mortality rates by race and ethnicity before and during the COVID-19 pandemic*," Friedman, et. al, 2022

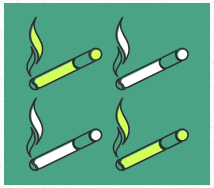
06

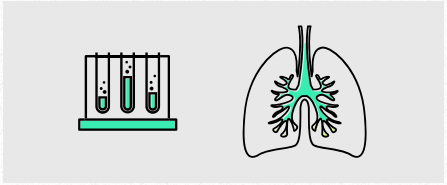
Future Work

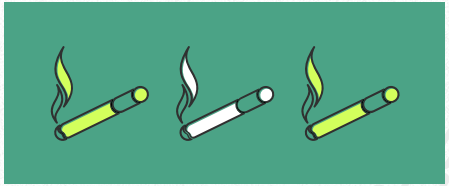
In the future, we hope to answer...

- Does the decrease in mortality rate only reflect white people getting treatment?
  - To do: Create difference in difference plots between whites and each race
- How successful are policy implementations between racial groups?
  - To do: Analyze the proportion of each racial group having a successful outcome (being in recovery) after participating in treatment
- How can we improve equal access for opioid treatment?
  - To do: Investigate cases where the distribution of successful outcome between racial groups is equal. What are these institutions doing differently? And, why is it working better?









THANK YOU

“Opioid care for all: because health is a right, not a privilege”
- Anonymous

References

Altekruse, S. F., Cosgrove, C. M., Altekruse, W. C., Jenkins, R. A., & Blanco, C. (2020, January 17). Socioeconomic risk factors for fatal opioid overdoses in the United States: Findings from the mortality disparities in American Communities Study (MDAC). PloS one. Retrieved December 9, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6968850/

Centers for Disease Control and Prevention. (2022, September 6). FASTSTATS - deaths and mortality. Deaths and Mortality. Retrieved November 10, 2022, from https://www.cdc.gov/nchs/fastats/deaths.htm

Green, A. R., Carney, D. R., Pallin, D. J., Ngo, L. H., Raymond, K. L., Iezzoni, L. I., & Banaji, M. R. (2007, September). Implicit bias among physicians and its prediction of thrombolysis decisions for black and white patients. Journal of general internal medicine. Retrieved December 9, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2219763/

Joseph R. Friedman, M. P. H. (2022, April 1). US drug overdose mortality rates by race and ethnicity before and during the COVID-19 pandemic. JAMA Psychiatry. Retrieved December 9, 2022, from https://jamanetwork.com/journals/jamapsychiatry/fullarticle/2789697

Home. Funding for Medication-Assisted Treatment (MAT) - Rural Community Toolbox. (n.d.). Retrieved November 29, 2022, from https://www.ruralcommunitytoolbox.org/funding/topic/medication-assisted-treatment

Home Page. LHSFNA. (2022, October 3). Retrieved November 29, 2022, from https://www.lhsfna.org/