



# ADDRESSING INEQUITY THROUGH MODELING:

UPDATING PUBLIC DEFENSE FUNDING  
MODELS IN WASHINGTON STATE

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## BACKGROUND

**PUBLIC DEFENSE:** "A public defender is a lawyer appointed to represent people who otherwise cannot reasonably afford to hire a lawyer to defend themselves in a trial."

- ❑ Required by the sixth amendment and *Gideon v. Wainwright* (1963).

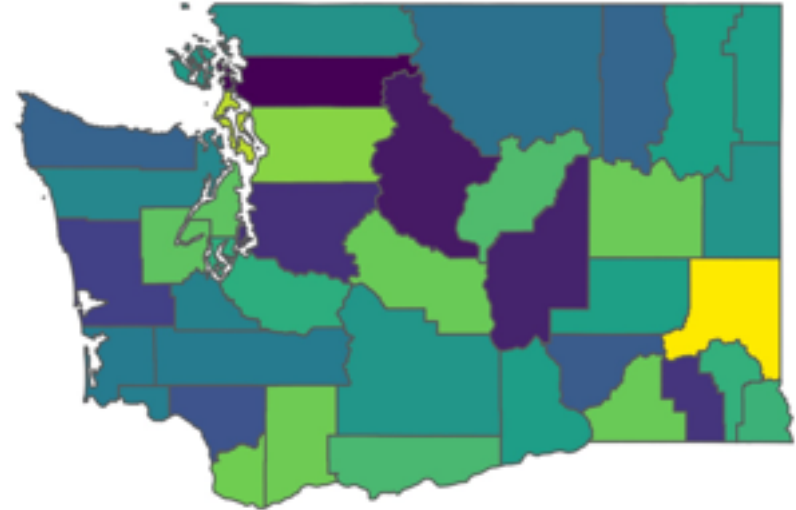


## PUBLIC DEFENSE IN WASHINGTON STATE

Washington State has a **decentralized** defense system, with each of the 39 counties applying for and spending money on public defense independently.

### Public Defense Spending Per Capita in 2019

*Data from the Washington State Office of Public Defense*







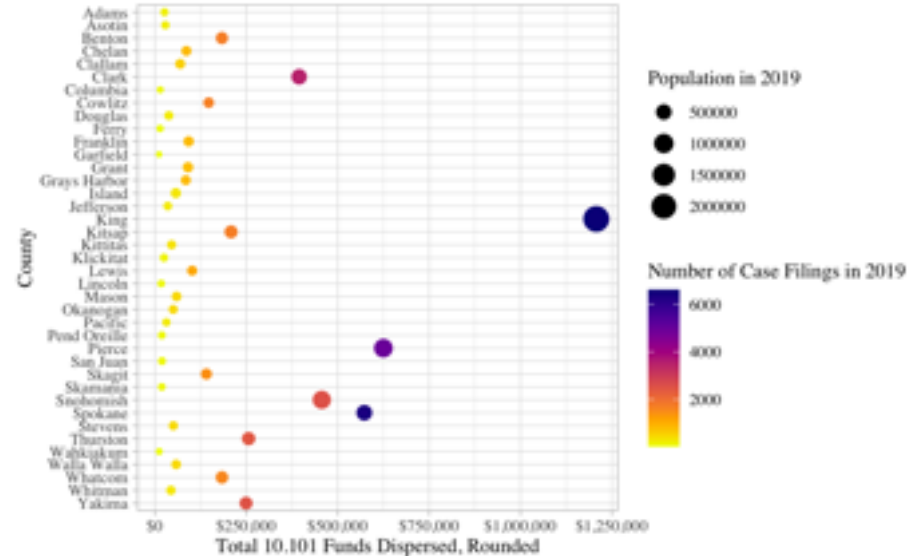
## THE 10.101.060 MODEL

The 10.101.060 funding model was created in response to pushes from both the OPD and WDA to consider both caseload amounts and population size when determining how public defense funds from the state are distributed by county.

This model has not been updated since 2005.

### Factors Considered in the RCW 10.101 Model

Data from Katrin Johnson with OPD: 10.101 2020 county disbursement estimates.xlsx



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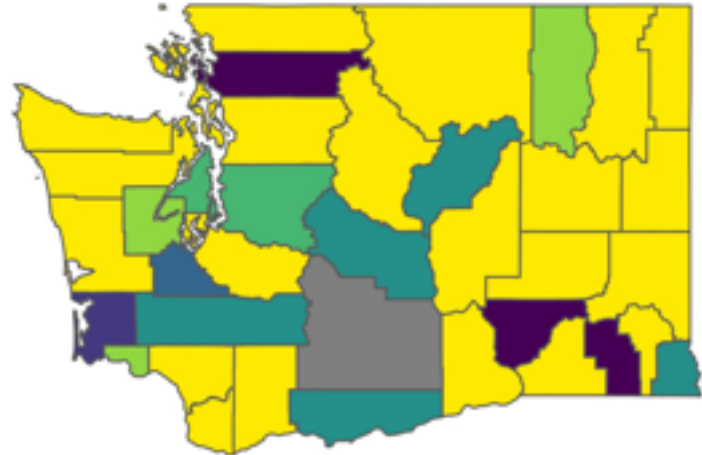


## SHORTCOMINGS OF THE 10.101.060 MODEL

- ❑ Only considers population and misdemeanor caseload
- ❑ Assumes that the cost of defense is **equivalent** in each county
  - ❑ Equal, but not **equitable**

### Expert Witness Resources by County (2018)

*Data from the Washington State Office of Public Defense\**



1: Expert witnesses used in all courts;  
2-6: At least one court doesn't use  
expert witnesses;  
7: No expert witnesses used





## GOALS IN MODEL MAKING

In our model we hope to:

- ❑ Account for more variables:
  - ❑ Poverty,
  - ❑ Median income,
  - ❑ Home prices,
  - ❑ etc.
- ❑ Increase model intuition and transparency,
  - ❑ Reduce arbitrariness





## NEW DATA

### *Annual Public Defense Spending by County*

- ❑ Spending on public defense from all sources

### *County Home Prices*

- ❑ Data on the price of homes from 2018-2019

### *Caseload Resources and Capacity 2018*

- ❑ County public defense expenditures on various resources: expert witnesses, appellate availability, etc.

### *OPD 10.101 Funding Over Time*

- ❑ Allocated budget by county



## MODELING SETUP

- ❑ We initially intended on modelling with the goal of minimizing the for 2005 to 2020.
- ❑ This was not possible as we had high quality data for 2018-2020

**Evaluation:** Predicting the *prop\_spending\_by\_year* (percent of spent public defense budget) for each county.





## MODEL ACCURACY

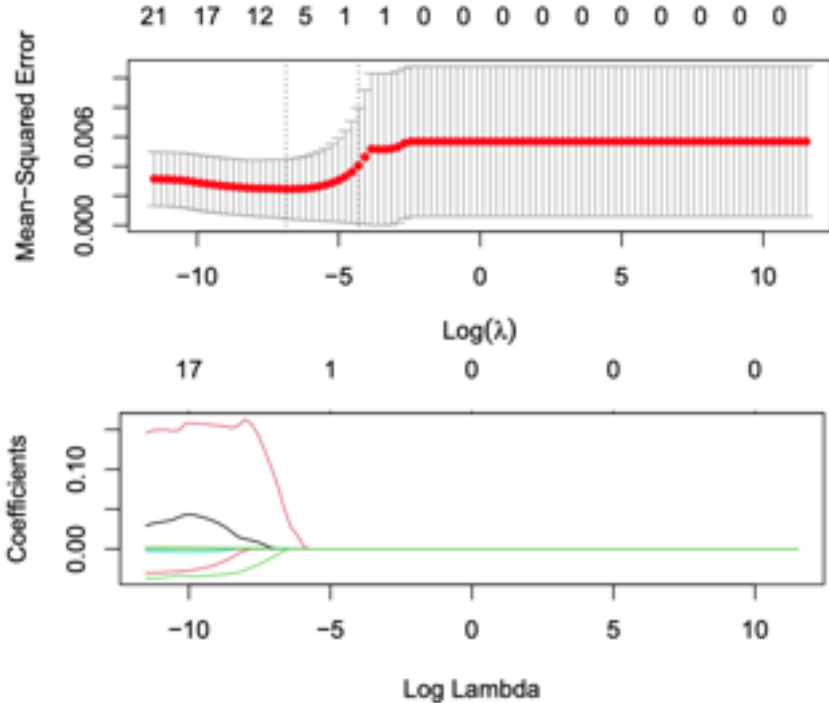
- ❑ Supervised Learning
  - ❑ Taking account of previous spending
- ❑ Feature selections have higher accuracy

### Model rMSE Comparison

<b>Model</b>	<b>rMSE</b>
LASSO	0.6880924
Pruned Tree	1.1437465
Forward Selection	1.2975837
Ridge Regression	1.5962485
Backward Selection	1.8675508
Bagged Tree	2.0988813
Full Linear	2.6480372
Random Forest	2.9691757



## BEST MODEL: LASSO



Best LASSO Model Coefficients

Variable	Coefficient
Population_2019	0.00002
Percent_Individuals_below_poverty_level_2015_2019	5.00727
Adult_felony_cases_per_1000	0.06815
Misdemeanor_cases_per_1000	0.05871
Juvenile_offender_cases_per_1000	0.00894
Juvenile_offender_cases_assigned_to_counsel	0.00128
Median_Home_Price_Q2_2019	0.00000

Coefficient 0 at Median Home Price,  
Adult Felony Appointment Rates,  
Median household income 20152019



## THE SHORTCOMINGS OF MODELING WITH SPARSE DATA

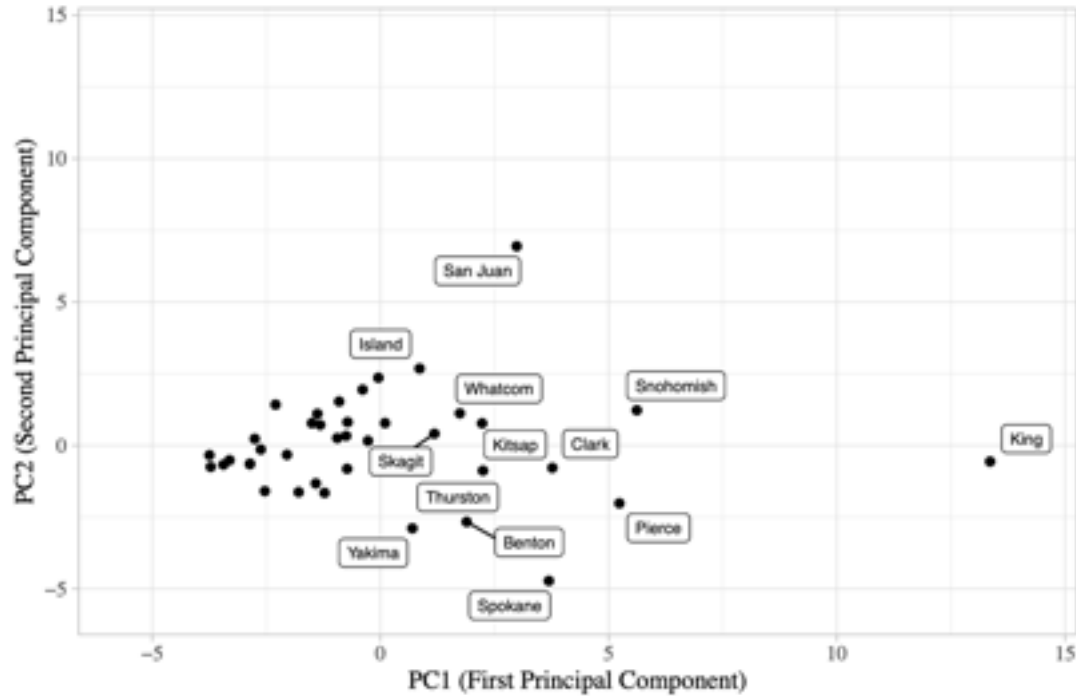
- ❑ We were restricted in scope by the limited number of years we had for our proxy data. Interpolating that data was unreasonable.
- ❑ The existence of King County in the train or test set created issues as it acted as a leverage point.





# PRINCIPAL COMPONENT ANALYSIS (PCA)

**PCA on All predictors on Washington County**



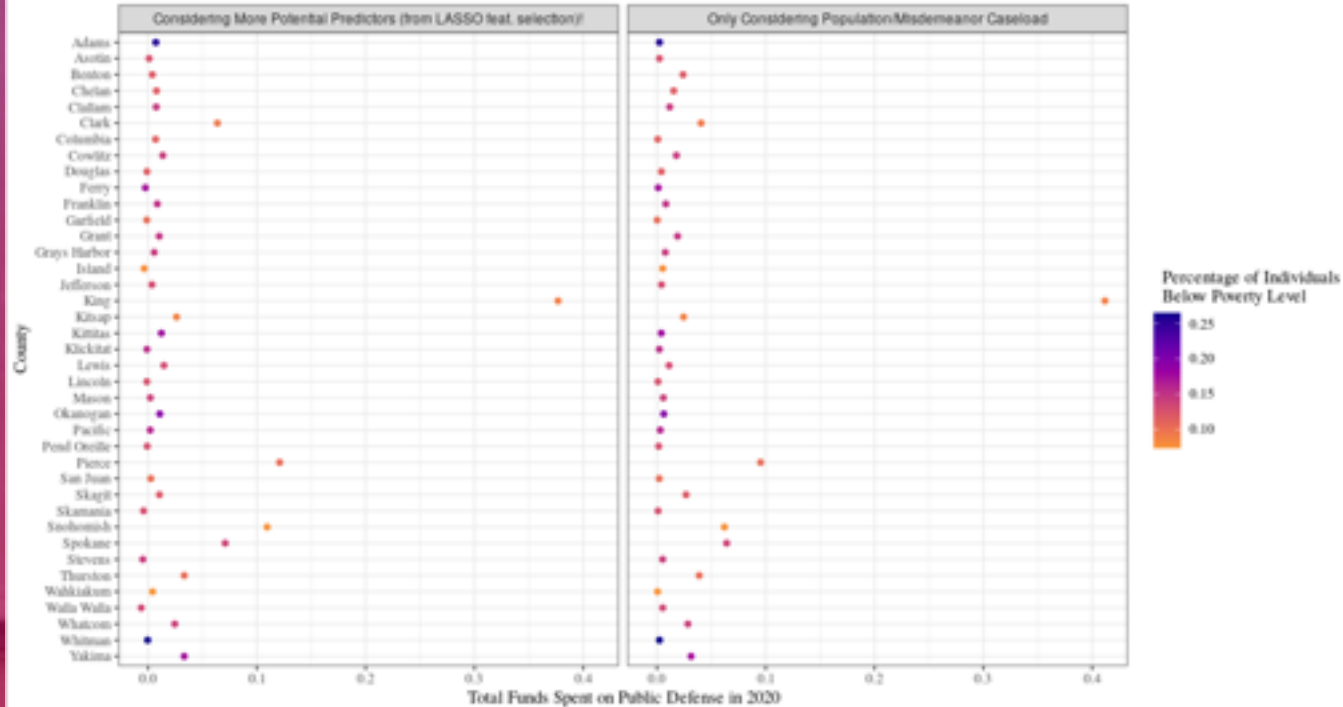


## CONCLUSIONS

- ❑ LASSO model performance compared to 10.101.060 model by poverty rates
- ❑ We allowed more transparency

### Considering LASSO's Ability to Account for Poverty Disparity

Data from *Katrin Johnson with OPD: 10.101 2020 county disbursement estimates.xlsx*





## FUTURE WORK

Continuation of work would look like:

- ❑ Further data collection in Washington
  - ❑ Requisition data for more years
- ❑ Secure data about outside funding distribution models
- ❑ Advocating for a new public defense allocation budget with more predictors





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