

# **The Impact of Mental Health Professional Density on Poor Mental Health**

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# There is a Mental Health Crisis in America Today!

**Ninety percent** of the public think there is a mental health crisis in the United States today



**One-third** of all adults report that they have felt anxious either always or often in the past year



**One-third** of respondents could not get the mental health services they needed



## Research Question

Does the Number of Mental Health Professionals per County Affect the Number of Poor Mental Health Days?

# County Level Analysis

County Health Rankings & Roadmaps Dataset

Subject variables:

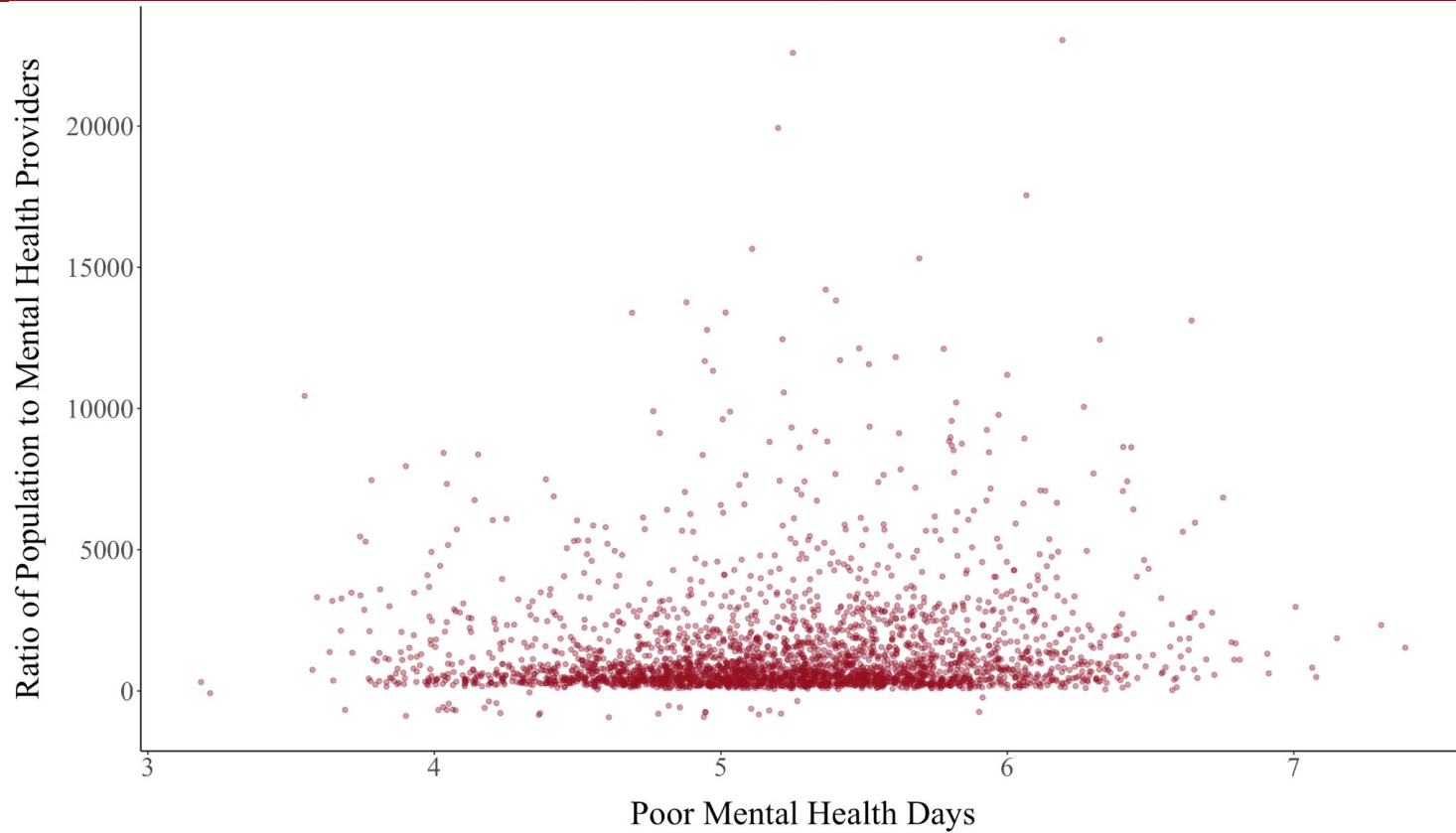
**Ratio of Population to  
Mental Health Professionals**

**Poor Mental Health Days**

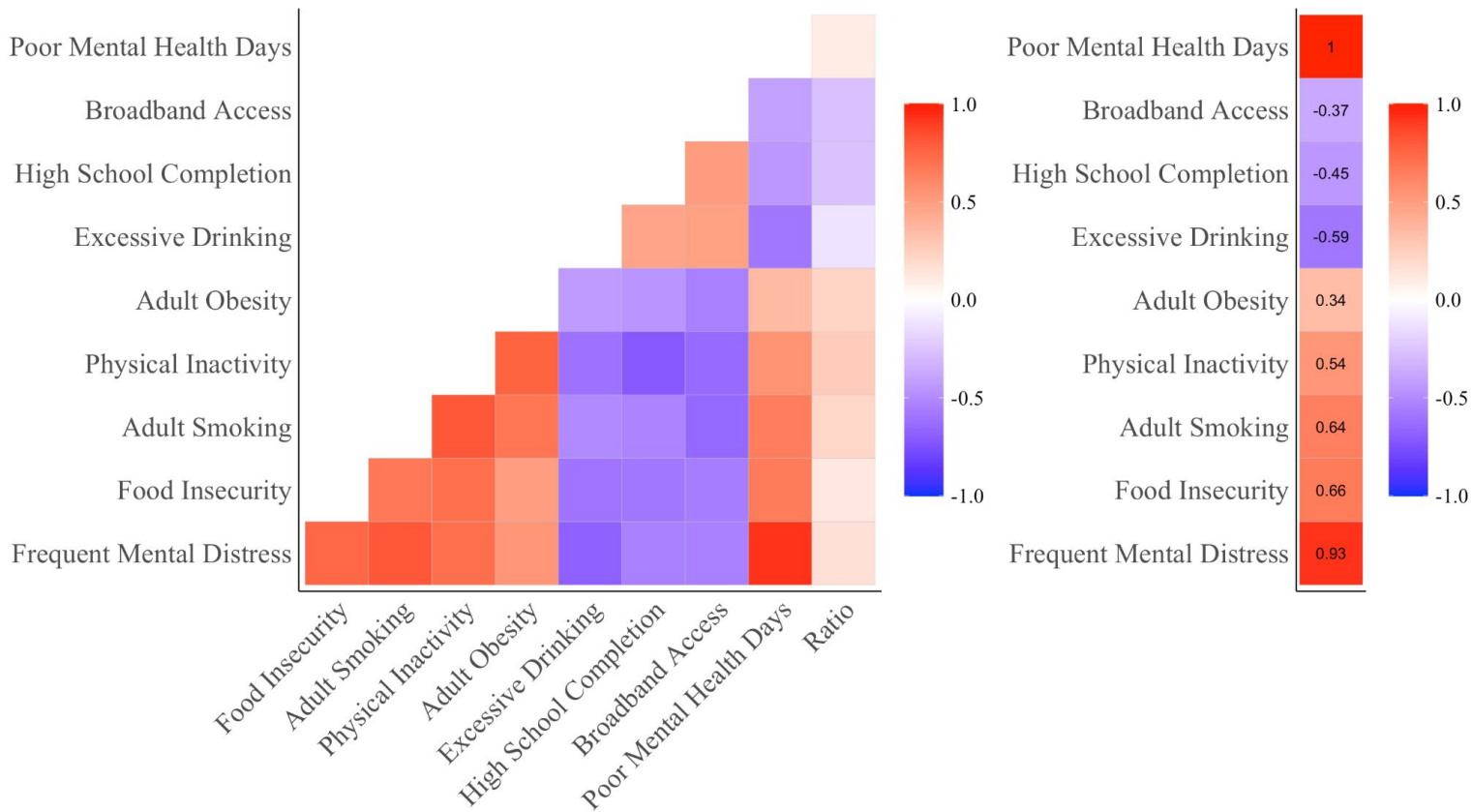
Variable Selection:

- Relevance to mental health and contributing factors
- Individual lifestyle factors vs demographics

# No Correlation!



# High Correlations Amongst *Different* Predictors



# Linear Model Selection

Final model obtained through cross-validation and assessing predictors (BIC, RMSE)

Chosen model predicts Poor Mental Health Days using four variables:

**Frequent Mental  
Distress**

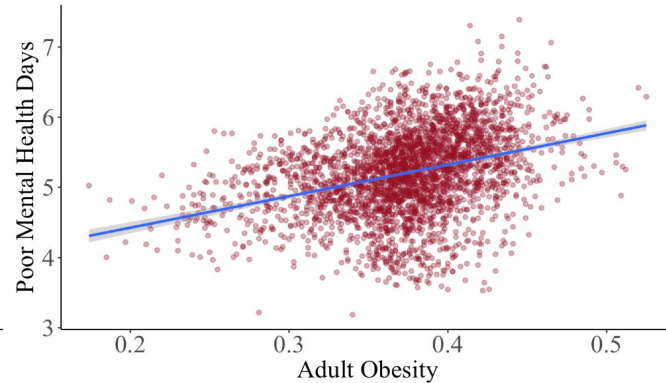
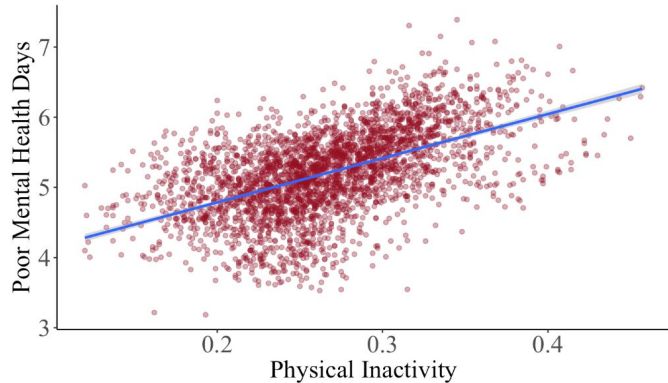
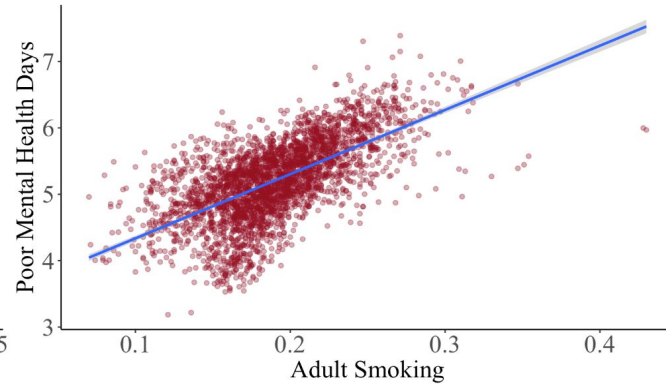
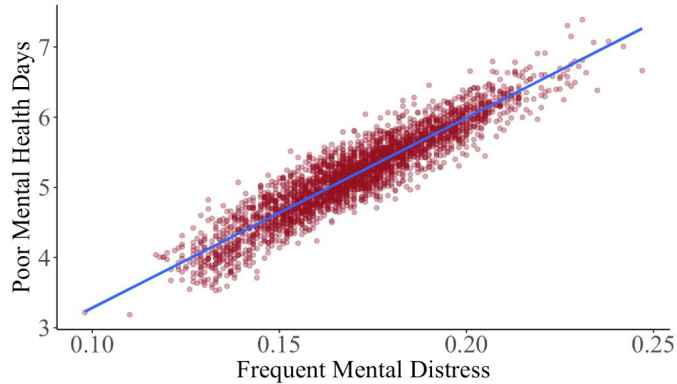
**Adult Smoking**

**Physical Inactivity**

**Adult Obesity**

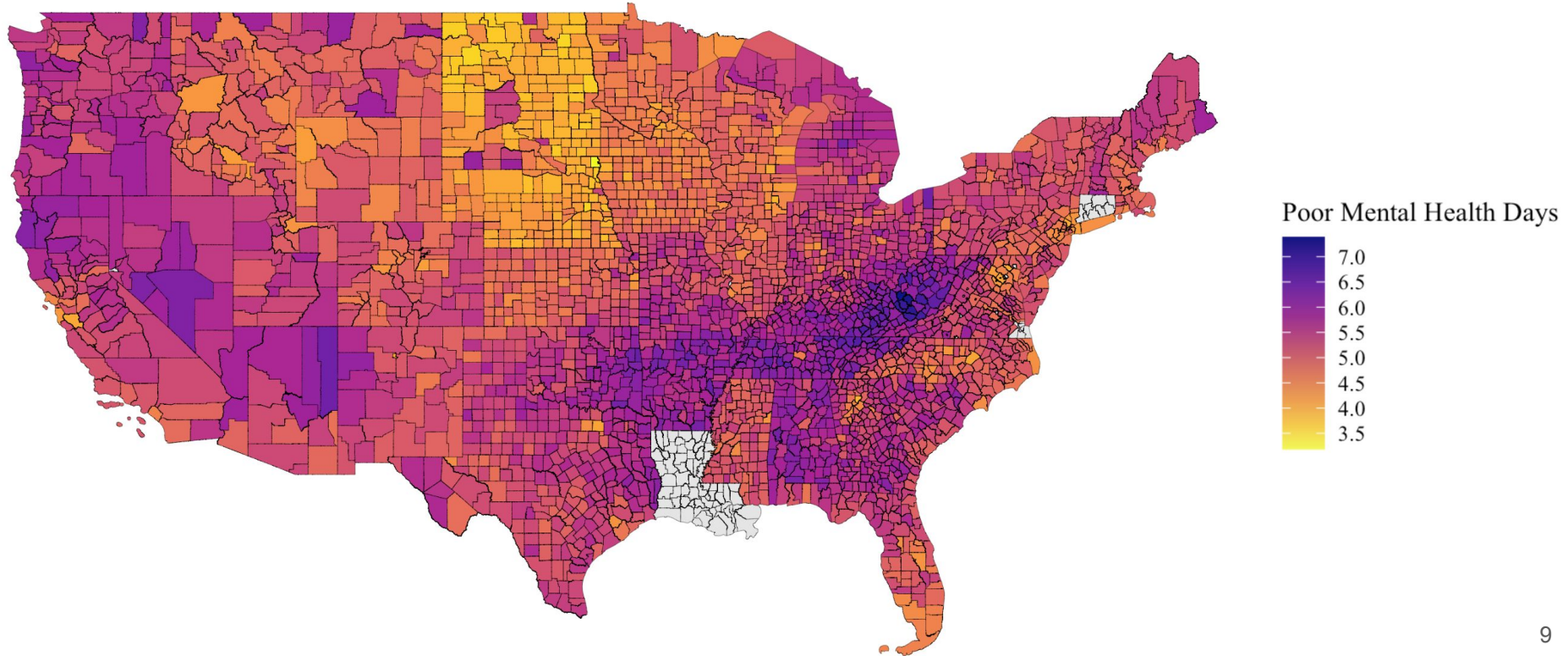
# Predictors Reflect Lifestyle and Well-Being

## Linear Relationship between Response and Predictor Variables





# Mental Health Trends Vary Across Continental US

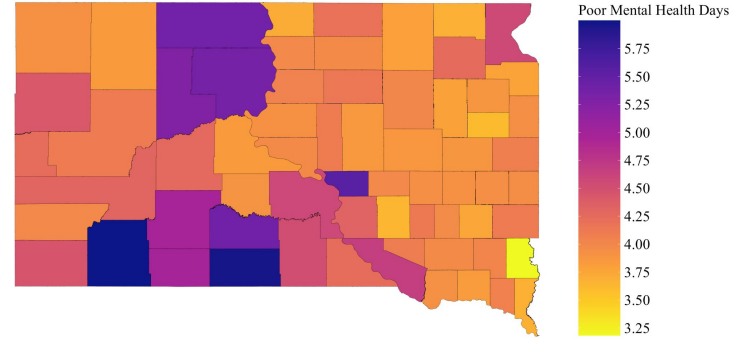


# Predictors Have Different Impacts Among States

Poor Mental Health Days  
raw value

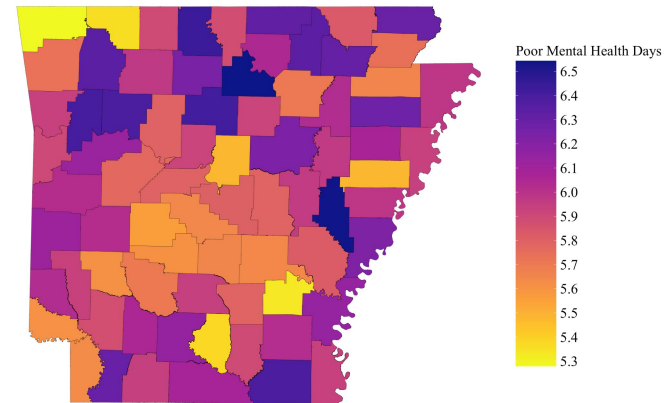
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	4.15	4.11 – 4.18	<b>&lt;0.001</b>
Frequent Mental Distress raw value	0.80	0.54 – 1.06	<b>&lt;0.001</b>
Adult Smoking raw value	-0.30	-0.60 – -0.01	<b>0.043</b>
Physical Inactivity raw value	0.00	-0.18 – 0.18	0.993
Adult Obesity raw value	-0.01	-0.09 – 0.07	0.865

South Dakota:



<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	5.95	5.90 – 5.99	<b>&lt;0.001</b>
Frequent Mental Distress raw value	0.37	0.27 – 0.48	<b>&lt;0.001</b>
Adult Smoking raw value	-0.07	-0.21 – 0.07	0.323
Physical Inactivity raw value	-0.06	-0.18 – 0.06	0.316
Adult Obesity raw value	-0.02	-0.10 – 0.06	0.631

Arkansas:



# Conclusions

1

Ratio of Mental Health Providers to Population does not affect poor mental health days

2

Best predictors of poor mental health days are:

- Frequent Mental Distress
- Adult Smoking
- Physical Inactivity
- Adult Obesity

3

Insights on Substance Use and Mental Health

# Insights on Substance Use and Mental Health

1. **Negative Correlation**
2. **Implications for Mental Health Care**
  - a. Interventions should focus on healthier coping mechanisms and reducing reliance on substances.
  - b. Increased access to:
    - i. Mental health services*
    - ii. Community support programs*
    - iii. Public health campaigns.*
  - c. Education on the risks of substance abuse and promotion of mental well-being.

## Current Limitations

- Can not compare across states due to data collection methods
- Small sample size for county level analysis
- Lack of statistical significance at state level

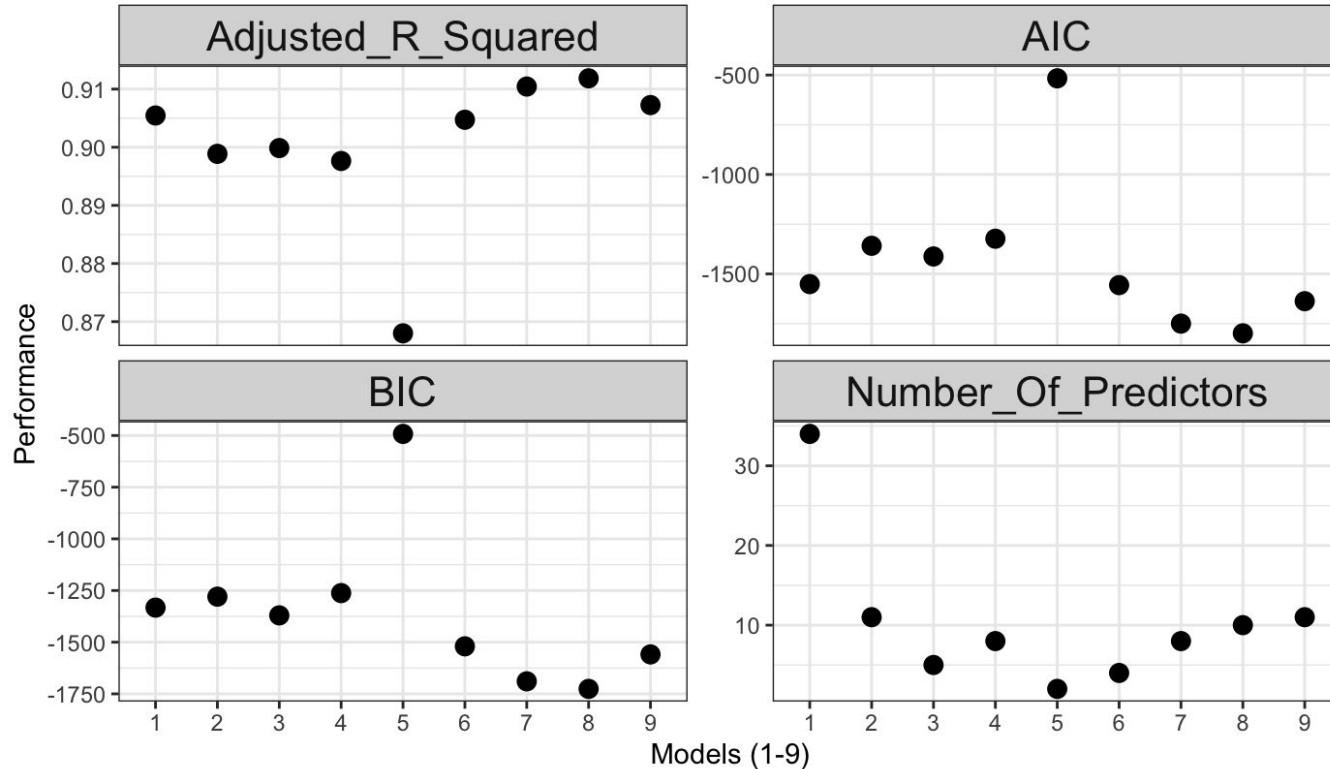
## Future Work

- Focus on individual patient data
- Understand variability in state mental health policies and regulation

# Appendix

# Comparison of 9 Linear Models For US Data

Model Performance Evaluation On US Data



# Model 6 Seems To Be The Most Practical Choice

## Model 6:

1. Frequent Mental Distress
2. Adult Smoking
3. Physical Inactivity
4. Adult Obesity

## Model 7:

### Model 6 Plus:

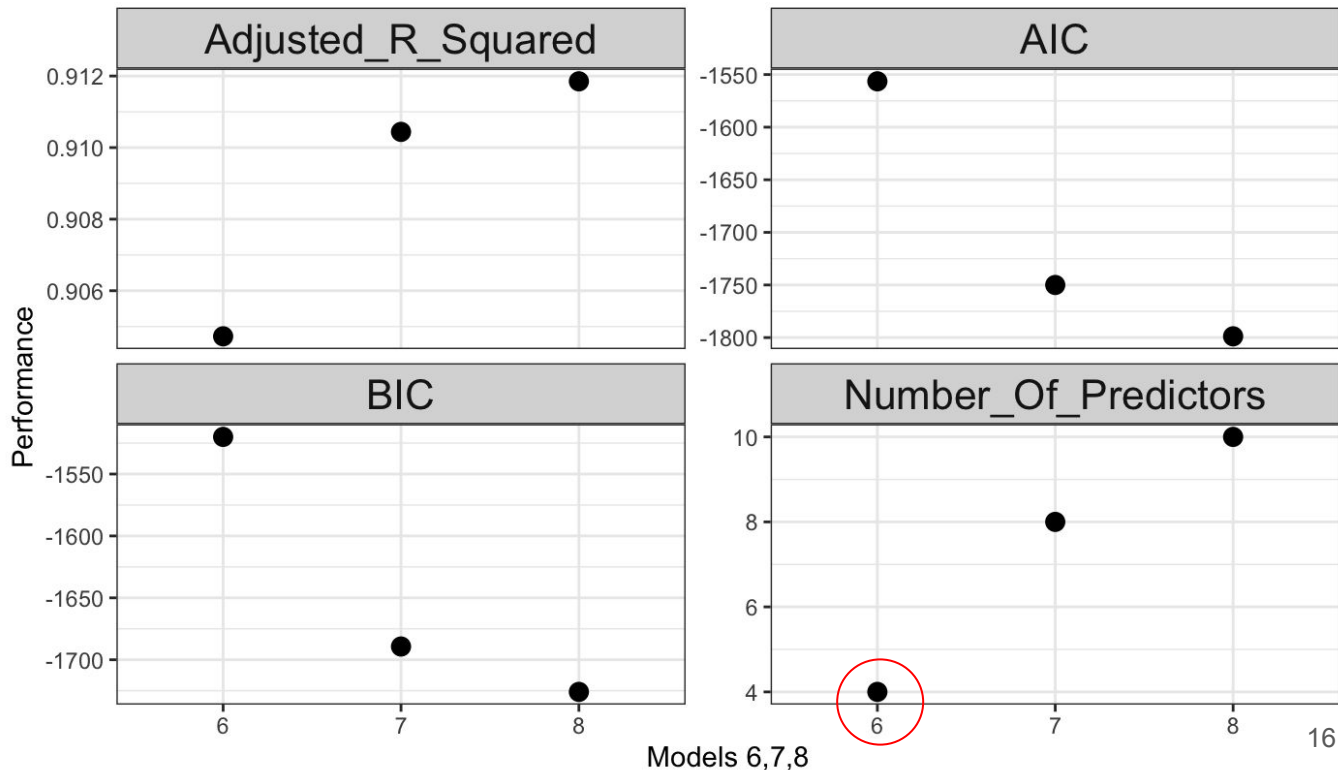
1. Excessive Drinking
2. BroadBand Access
3. Asian %
4. Social Associations

## Model 8:

### Model 7 Plus:

1. Poor Physical Health Days
2. Poor/Fair Health

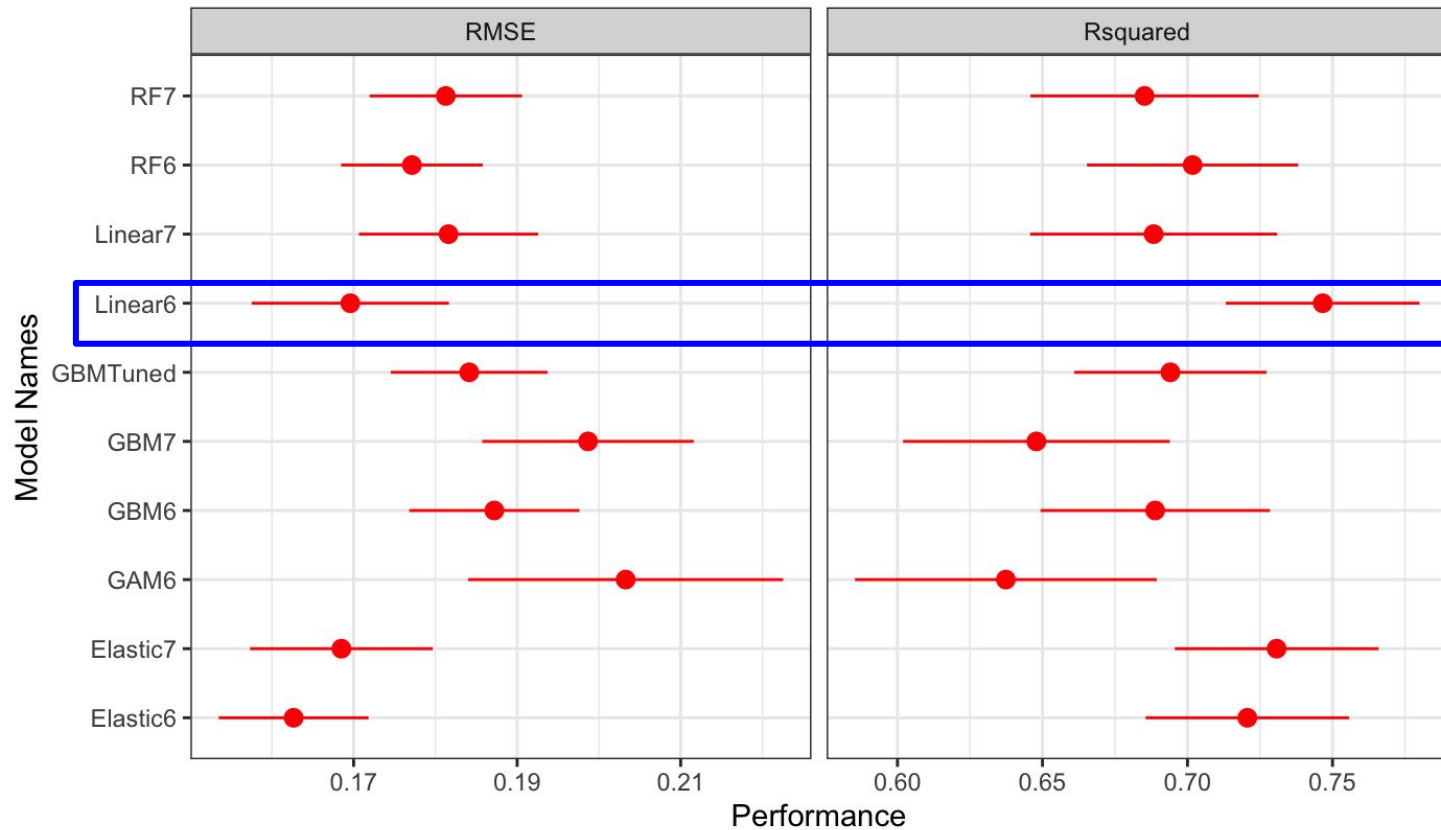
Model Performance Evaluation On US Data



Models 6,7,8

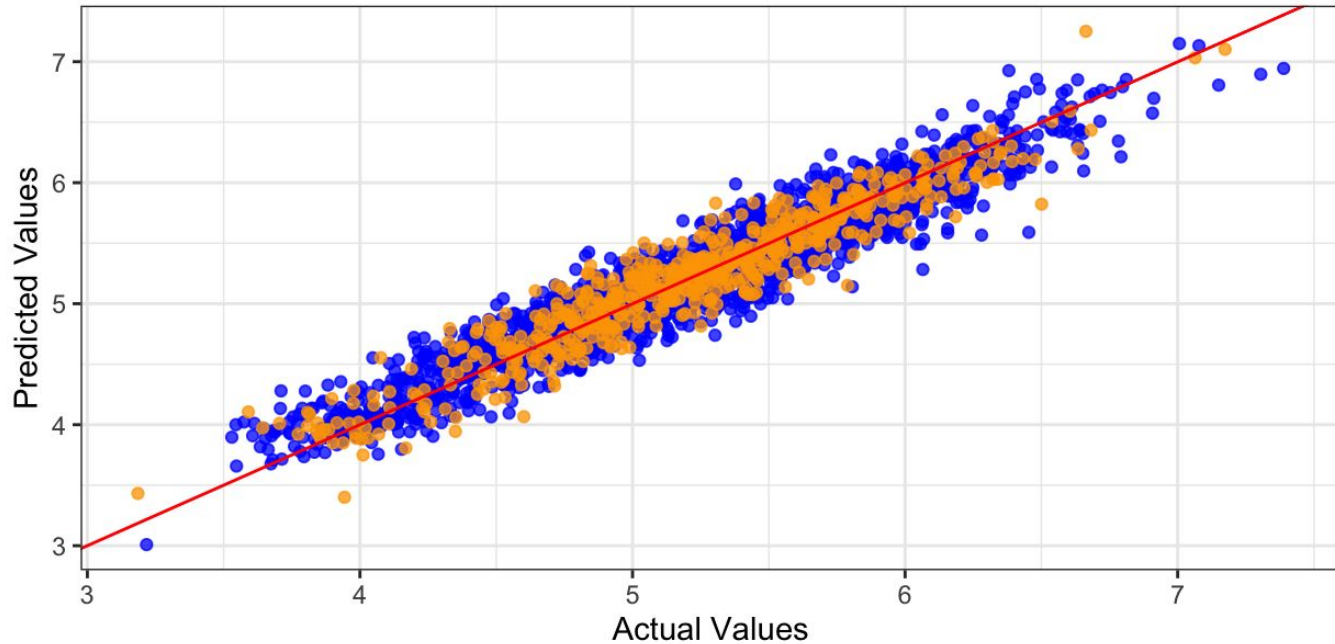


# Similar Performance Between Models



# Assure Model 6 Does Not Overfit

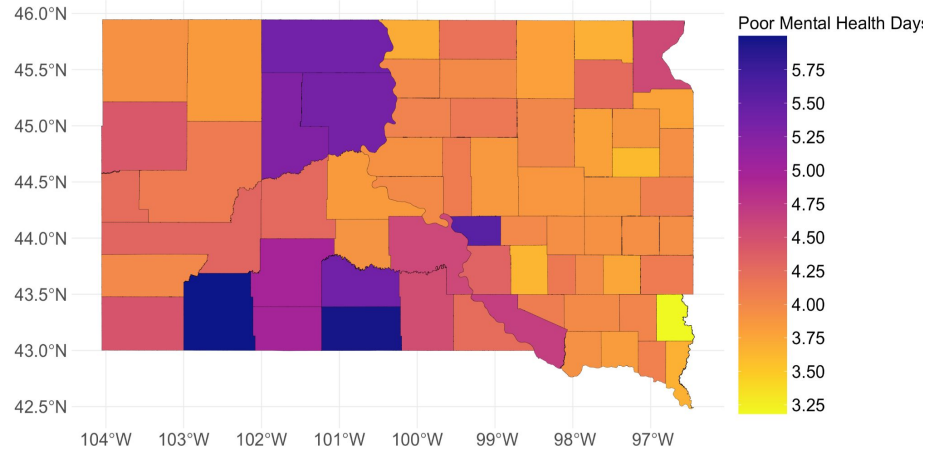
Model 6 Actual vs Predicted Values For US Data Mental Health Days



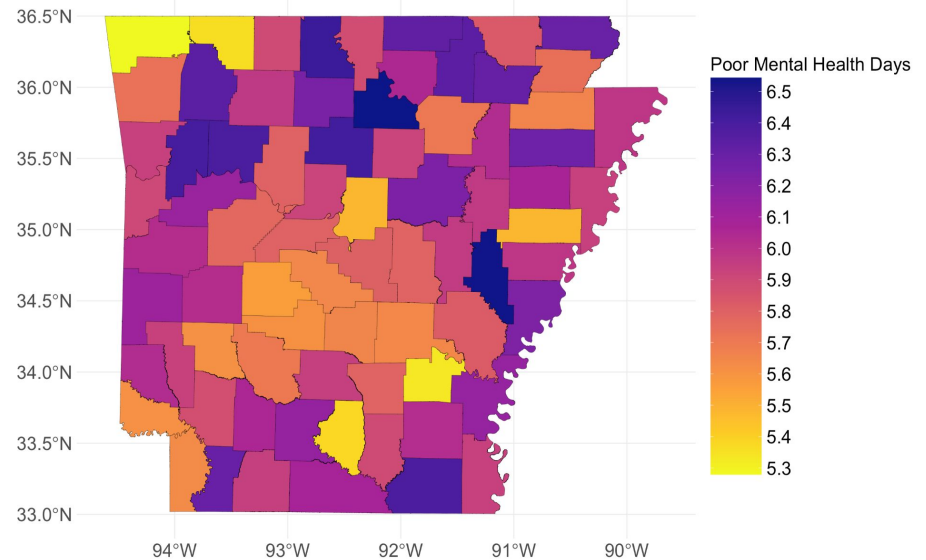
Data ● Test ● Train

# Do More Complex Models Seem To Assess The Data Better?

### Poor Mental Health Days in South Dakota

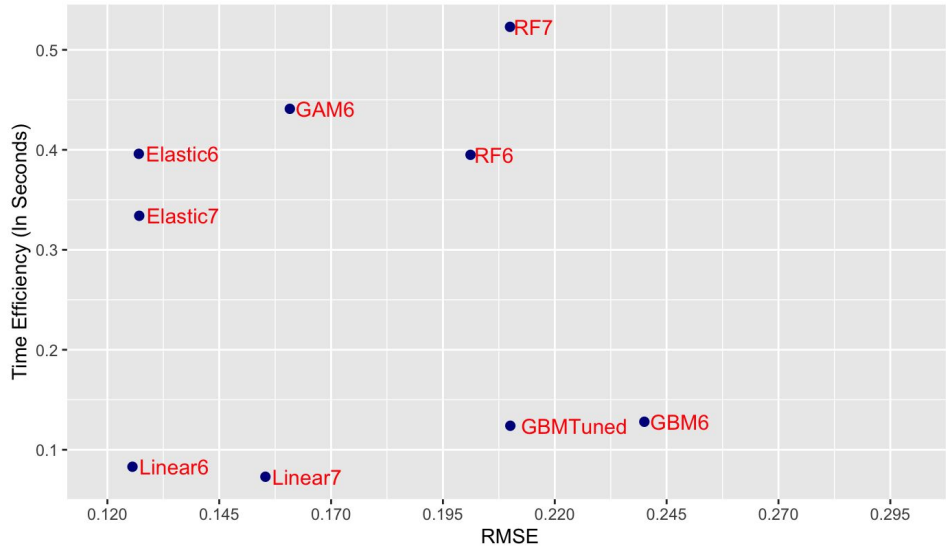


### Poor Mental Health Days in Arkansas

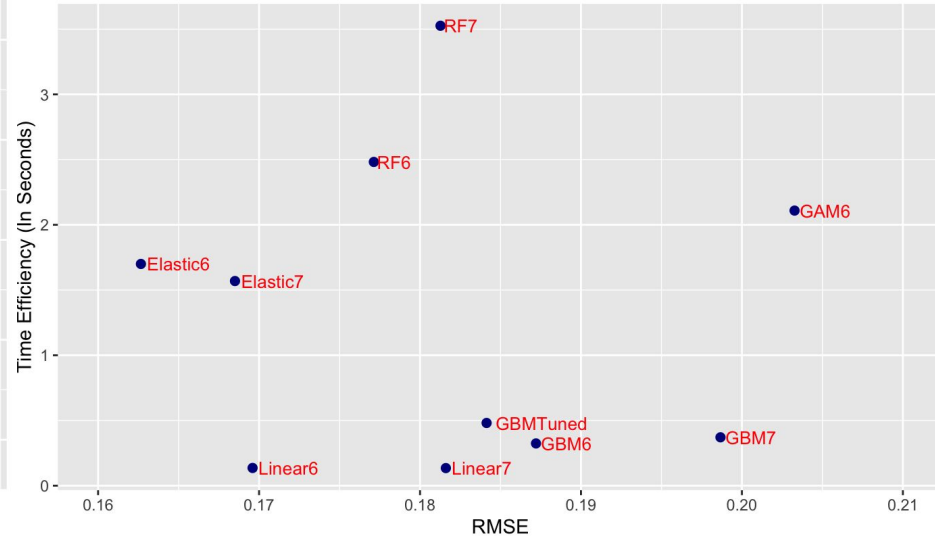


# Model Complexity *Does Not Equal* Better Performance

South Dakota Model Performance Based On Time Efficiency Per Model

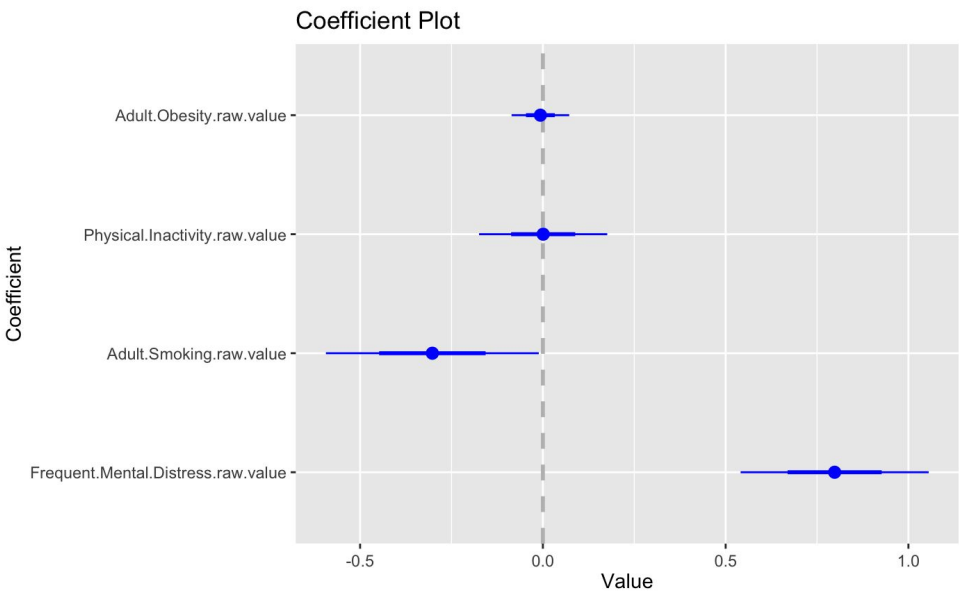


Arkansas Model Performance Based On Time Efficiency Per Model



# Coefficient Plots Of The Predictor For State Level Data

## South Dakota



## Arkansas

