Impact of Mental Health Professional Density on Poor Mental Health:

A county-level analysis of poor mental health predictors

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Background

Motivation: A KFF/CNN survey found that **90%** of respondents believe there is a mental health crisis in America today.

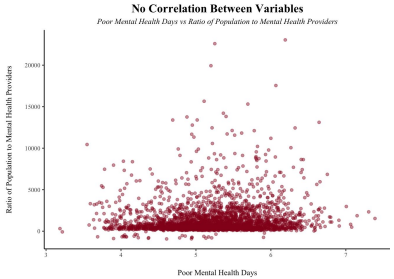
Main Questions
Does the number of mental health professionals per county affect the number of poor mental health days? What lifestyle factors can influence poor mental health days?

Importance: Understand individual lifestyle factors contributing to poor mental health to influence habit formation and improve the American mental health crisis.

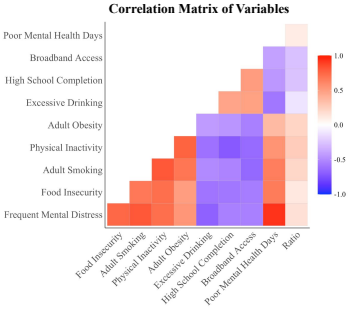
Data Source: Used the 2024 County Health Rankings & Roadmaps Dataset created and published by the University of Wisconsin Population Health Institute

Variables:
Poor Mental Health Days: 30 day age-adjusted average
Ratio of Population to Mental Health Providers: for every one provider, there is an x amount of individuals in a county

EDA

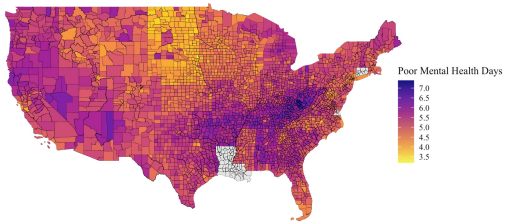


No relationship found between the number of mental health professionals per county and the number of poor mental health days



But, strong correlation found between other predictors and poor mental health days

State Analysis

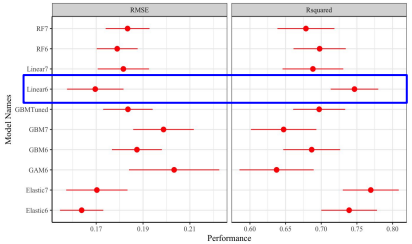


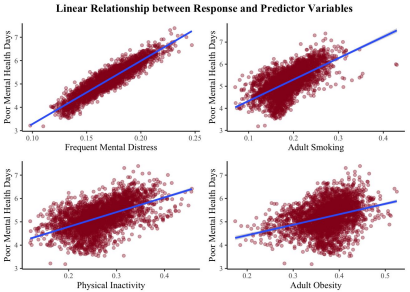
Map of response variables shows trends across US.

- Southern states showing higher numbers of poor mental health days
- Northern states showing lower numbers of poor mental health days
- Large amounts of variation within states

Methods

We trained 10 different models and choose a **linear model** as the best to predict Poor Mental Health Days because it is the most optimal in processing large amounts of data without sacrificing a statistically significant amount of performance



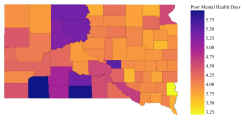


Results

Our best model contains four statistically significant predictors

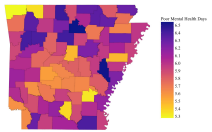
Model Tested on South Dakota Counties

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



Model Tested on Arkansas Counties

Predictors	*Estimates*	*CI*	*p*
(Intercept)	5.95	5.90 – 5.99	**<0.001**
Frequent Mental Distress raw value	0.37	0.27 – 0.48	**<0.001**
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



Limitations & Future Work

Conclusions

- Ratio of Mental Health Providers to Population does not affect poor mental health days
- Best predictors of poor mental health days are Frequent Mental Distress, Adult Smoking, Physical Inactivity, Adult Obesity
- Just because a model is more complex, does not mean it is a better choice

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
- Data was already summarized into counties instead of individual patients

Future work

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