



The Demographic and Social Predictors of Substance Abuse

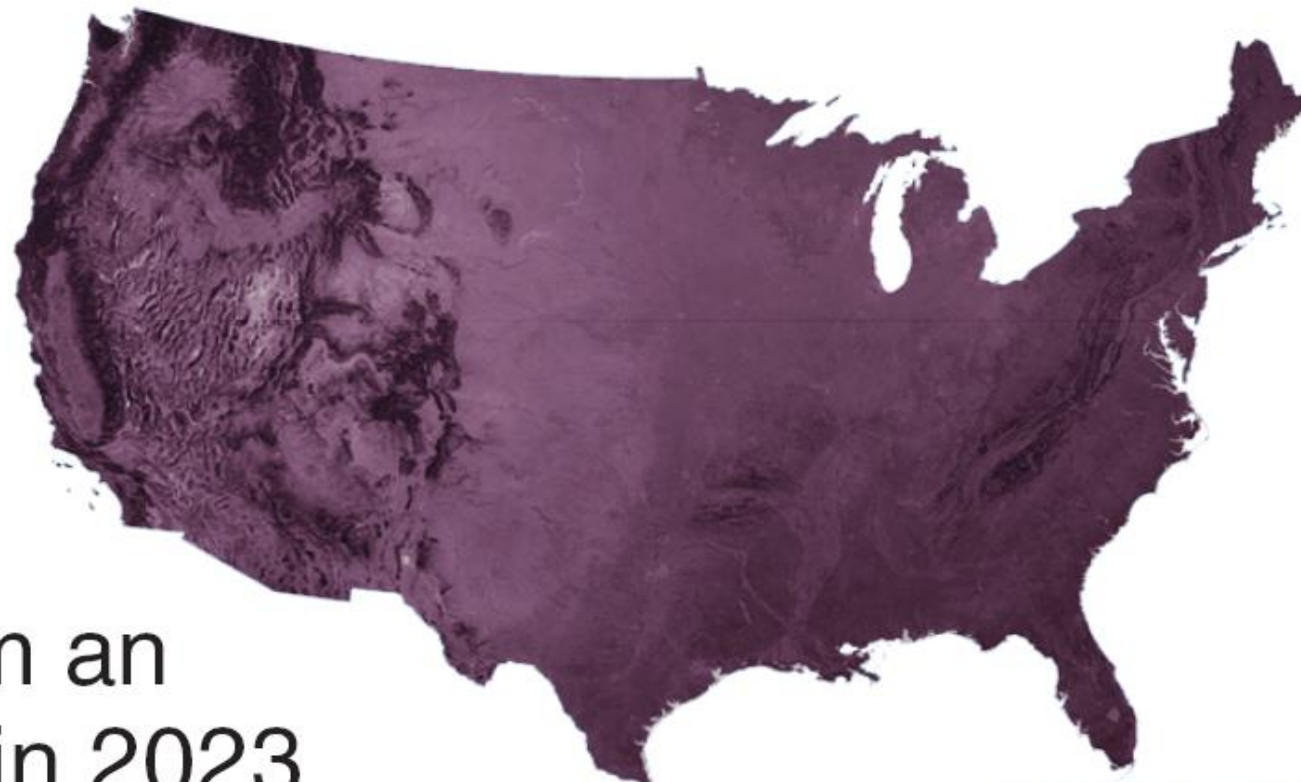
CMU SURE 2025

By: Becky Zhou, Georgina Mbonu, Thomas Kim



217
PEOPLE

died each day from an
opioid overdose in 2023.



<https://www.cdc.gov/overdos-prevention/about/understanding-the-opioid-overdose-epidemic.html>

Quick Facts *on* Drug Addiction

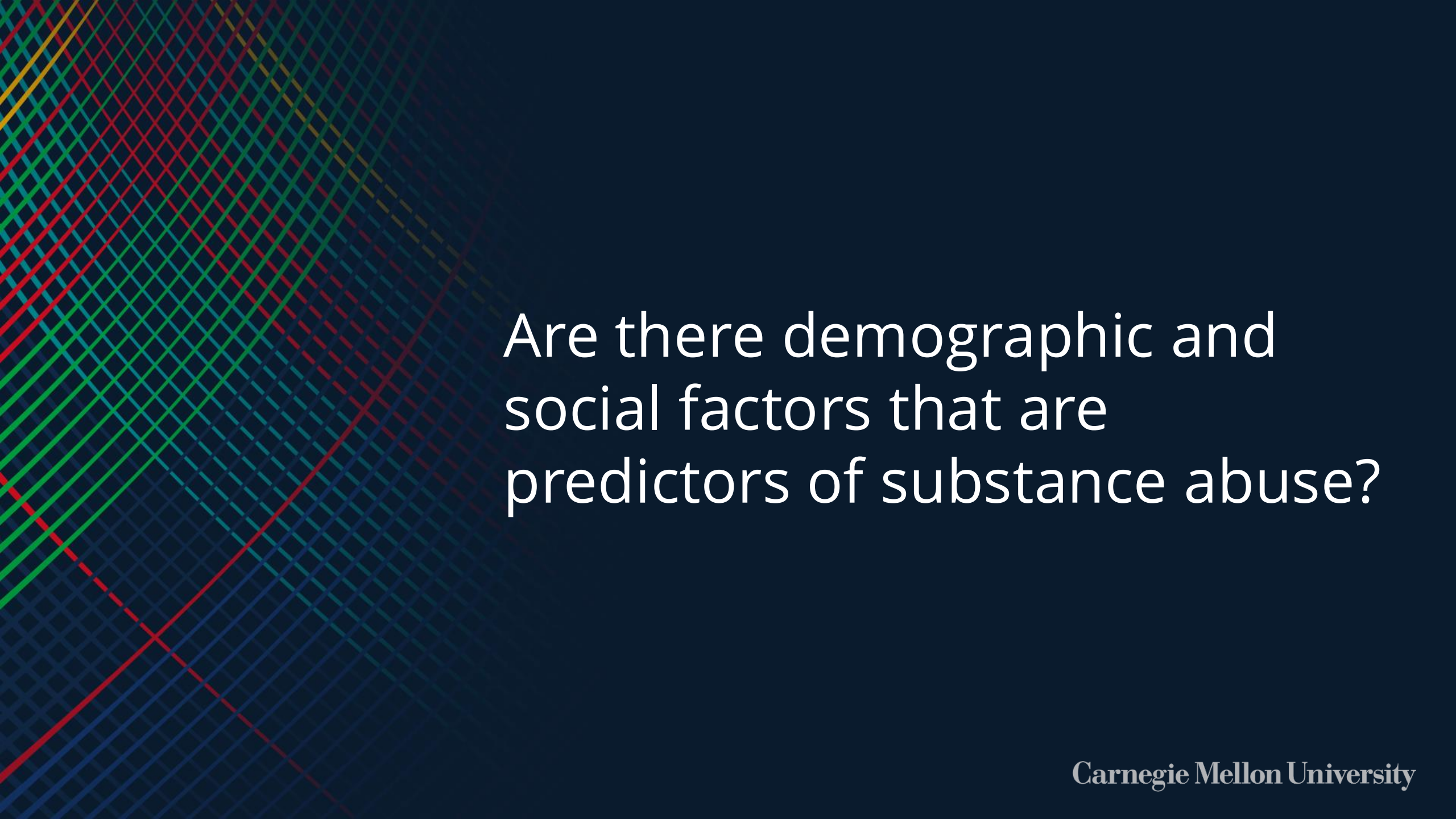


16.7% or 48.5 million Americans (aged 12 and older)
met the criteria for a substance use disorder within the past 12 months.



AmericanAddictionCenters

Source: 2023 United States National Survey on Drug Use and Health (NSDUH)
<https://www.samhsa.gov/data/release/2023-national-survey-drug-use-and-health-nsduh-releases>



Are there demographic and
social factors that are
predictors of substance abuse?



Data

Data is provided by County Health Rankings & Roadmaps

Response Variables

- Alcohol Impaired Driving Deaths (ADD)
- Drug Overdose Deaths
- Excessive Drinking

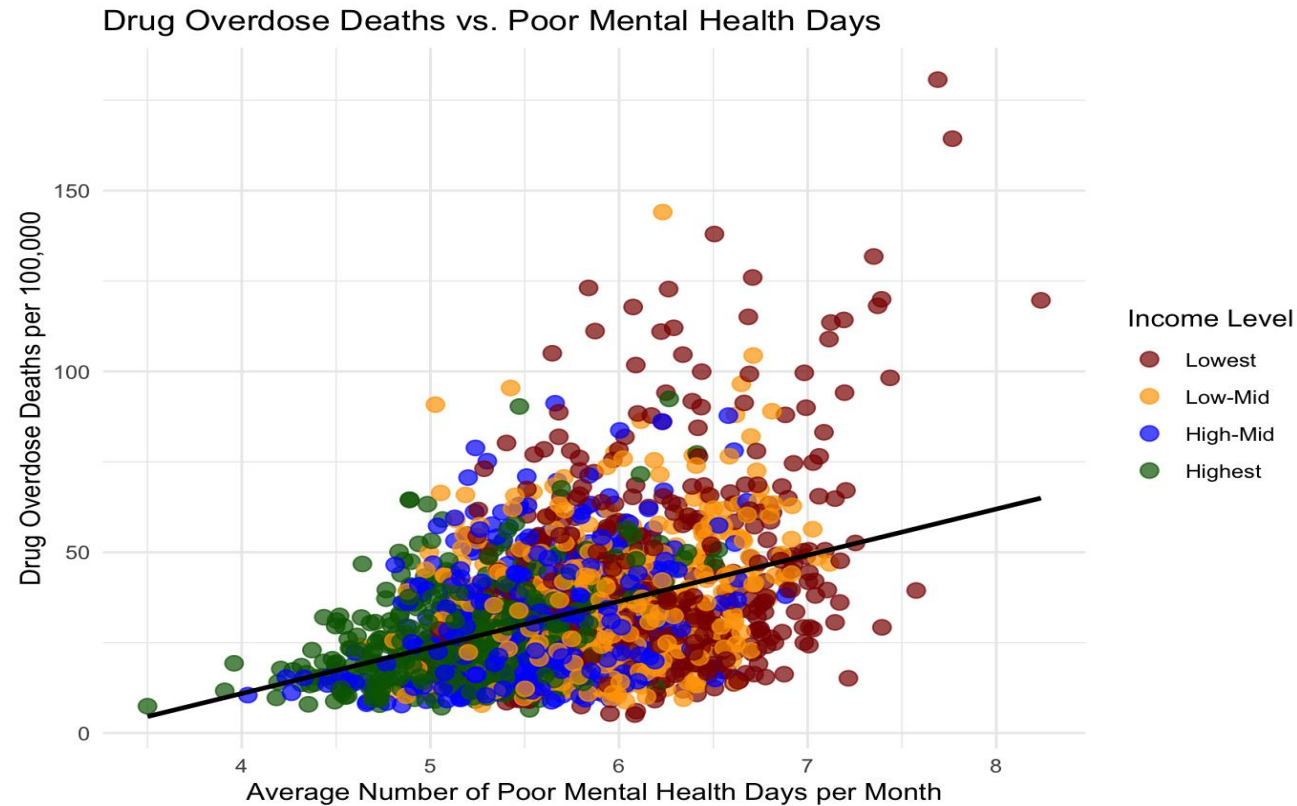
Demographic Variables

- 65+
- Female
- American Indian or Alaska native
- Disability (functional limitations)
- Uninsured children

Social Variables

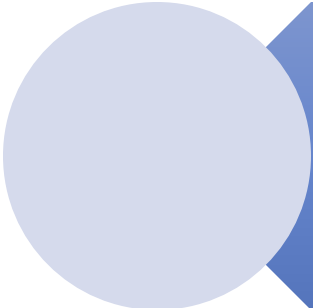
- Unemployment
- Severe Housing cost
- School funding adequacy
- Primary care physicians
- Broadband access

Low Income Counties Experience Higher Drug Overdose Death and More Poor Mental Health Days

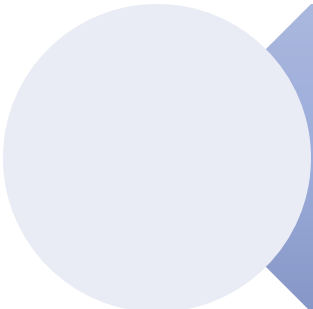




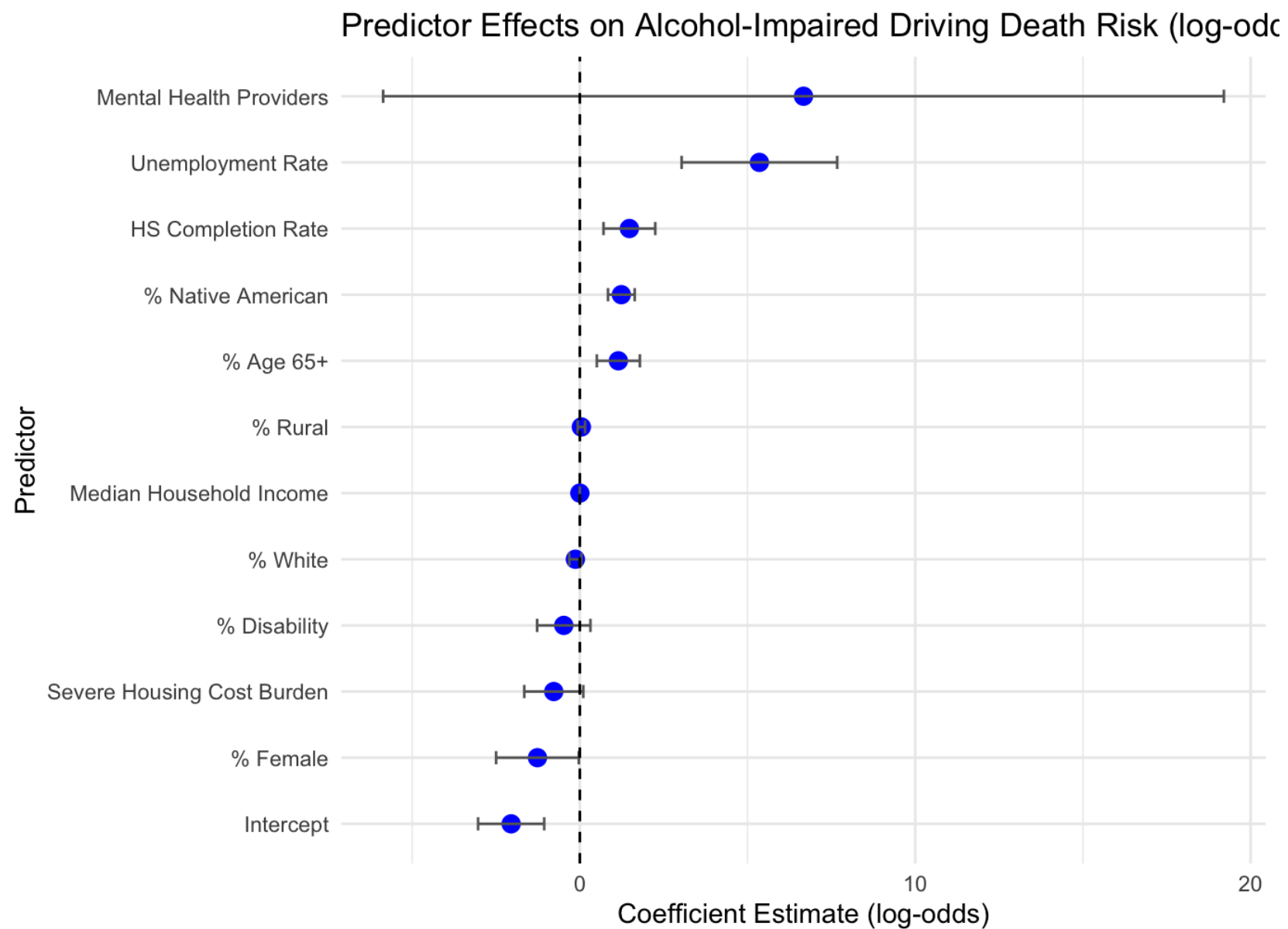
Multiple Linear Regression: Chosen for simplicity and interpretability, This model served as our baseline before moving to the Huber.



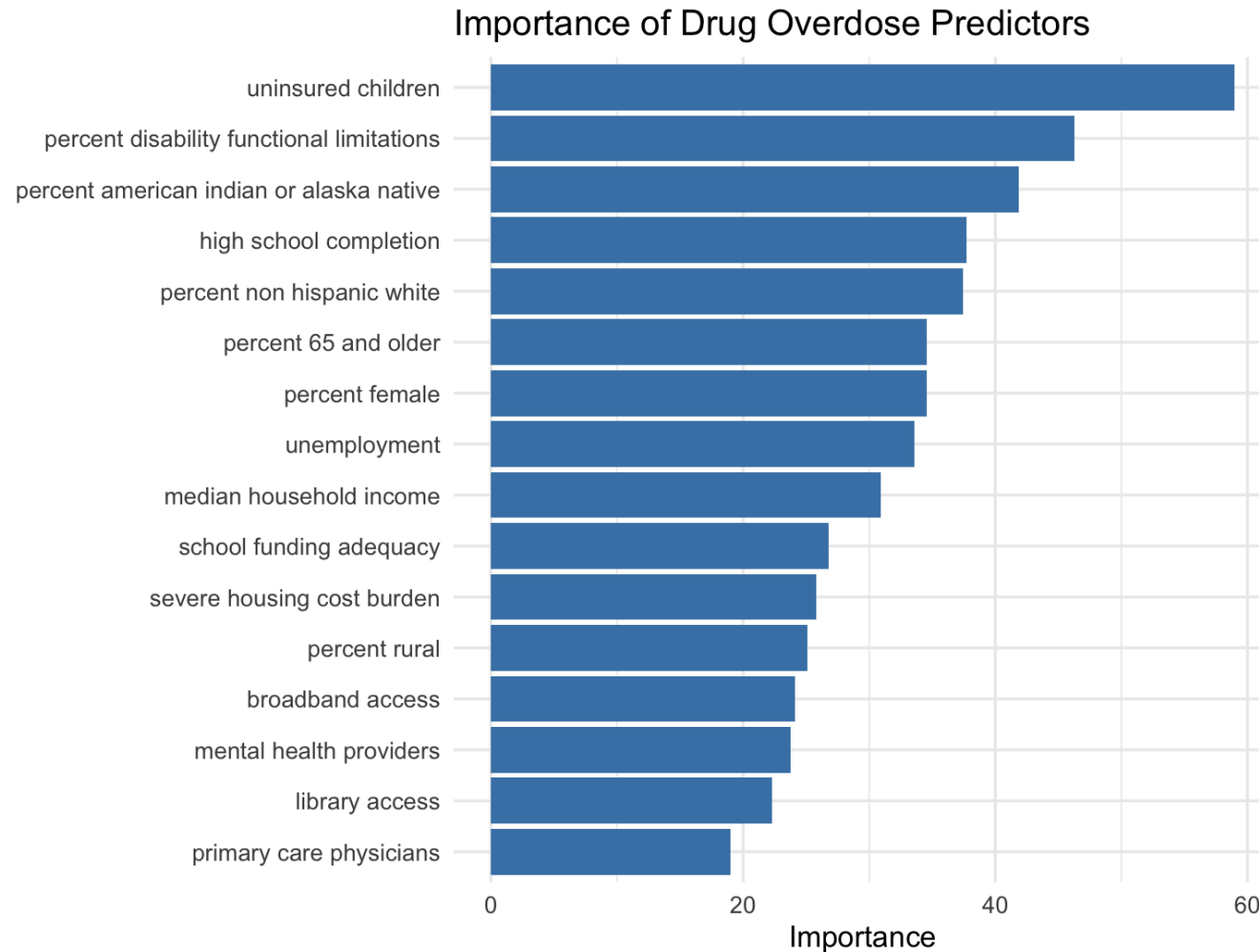
Huber Regression: To account for the presence of outliers we chose this model which reduces the effects of extreme values and uncovers relationships we wouldn't see otherwise.



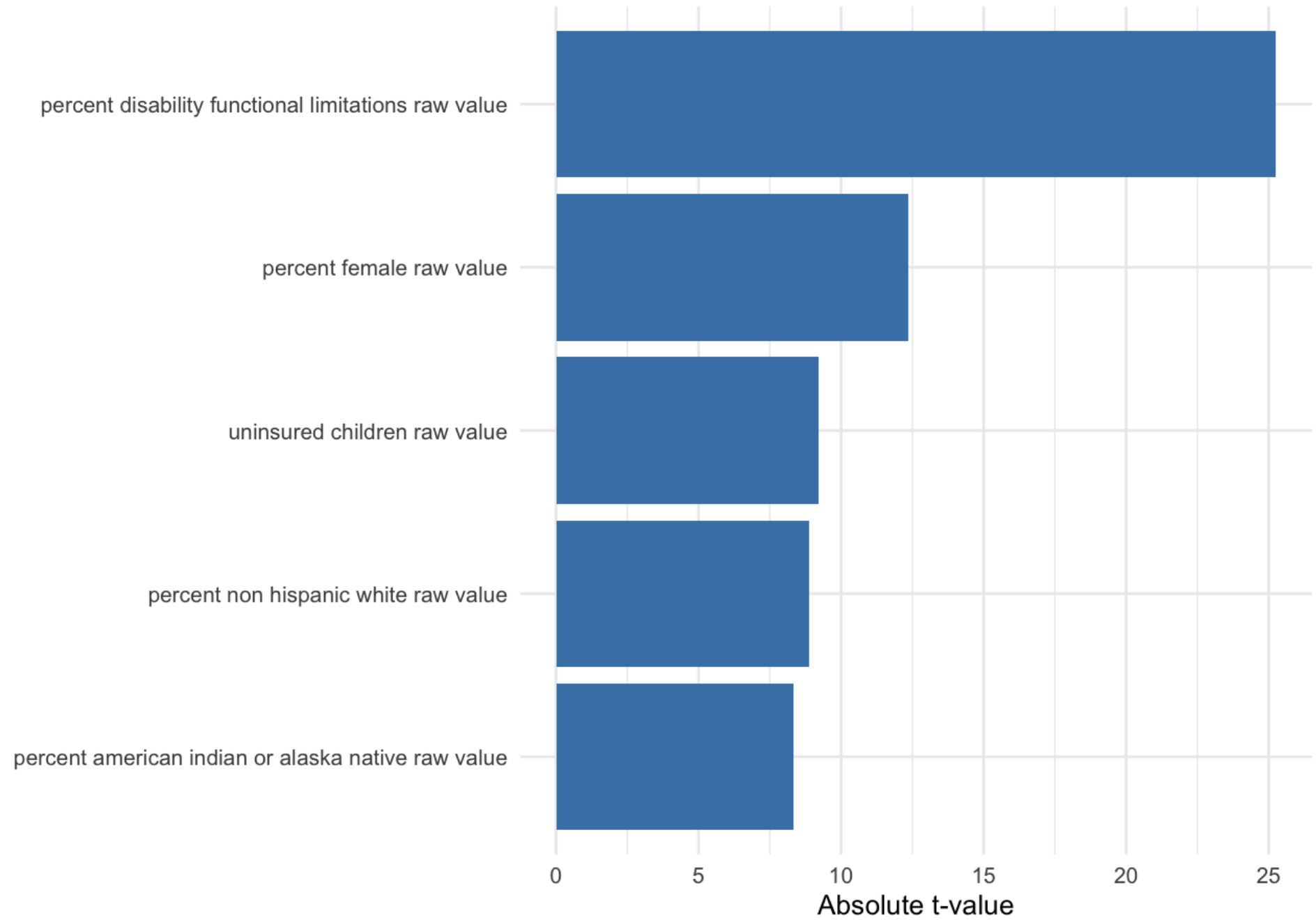
Random Forest: This non-parametric model accounts for non-linear relationships and gives insight to variable importance.



Rural Associated Traits Rank High in Drug Overdose Outcome

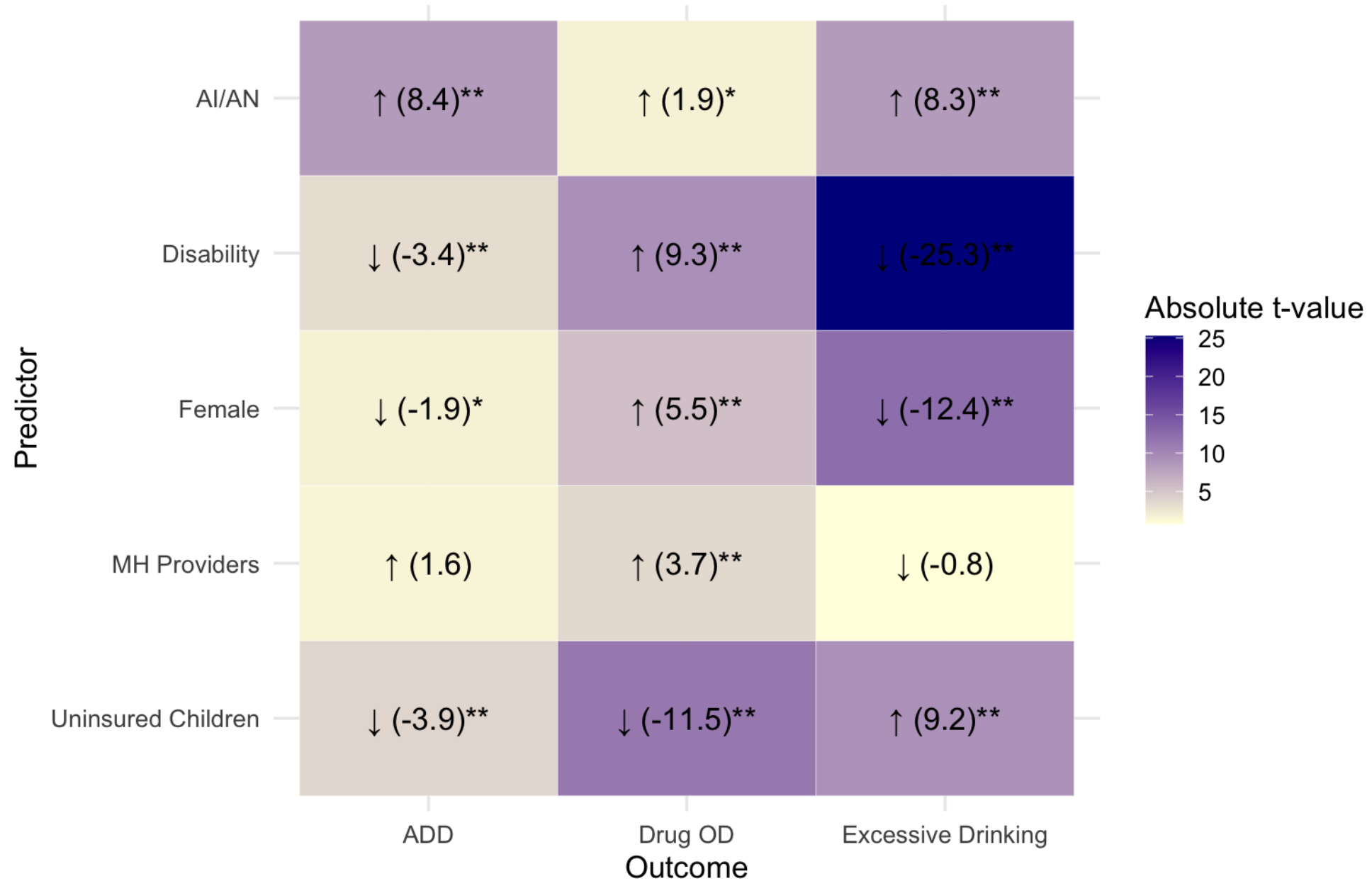


Top 5 Predictors of Excessive Drinking



Strength & Direction of Predictor Effects

↑/↓ shows direction, (t) is t-value, * = marginal, ** = significant





Recommendations

- Increase culturally competent care
- Prioritize non-opioid treatments for pain management
- Expand access of care in rural areas



Limitations

- Missing Data on Race/Ethnicity
- Self-Reporting Bias
- Rural Underreporting

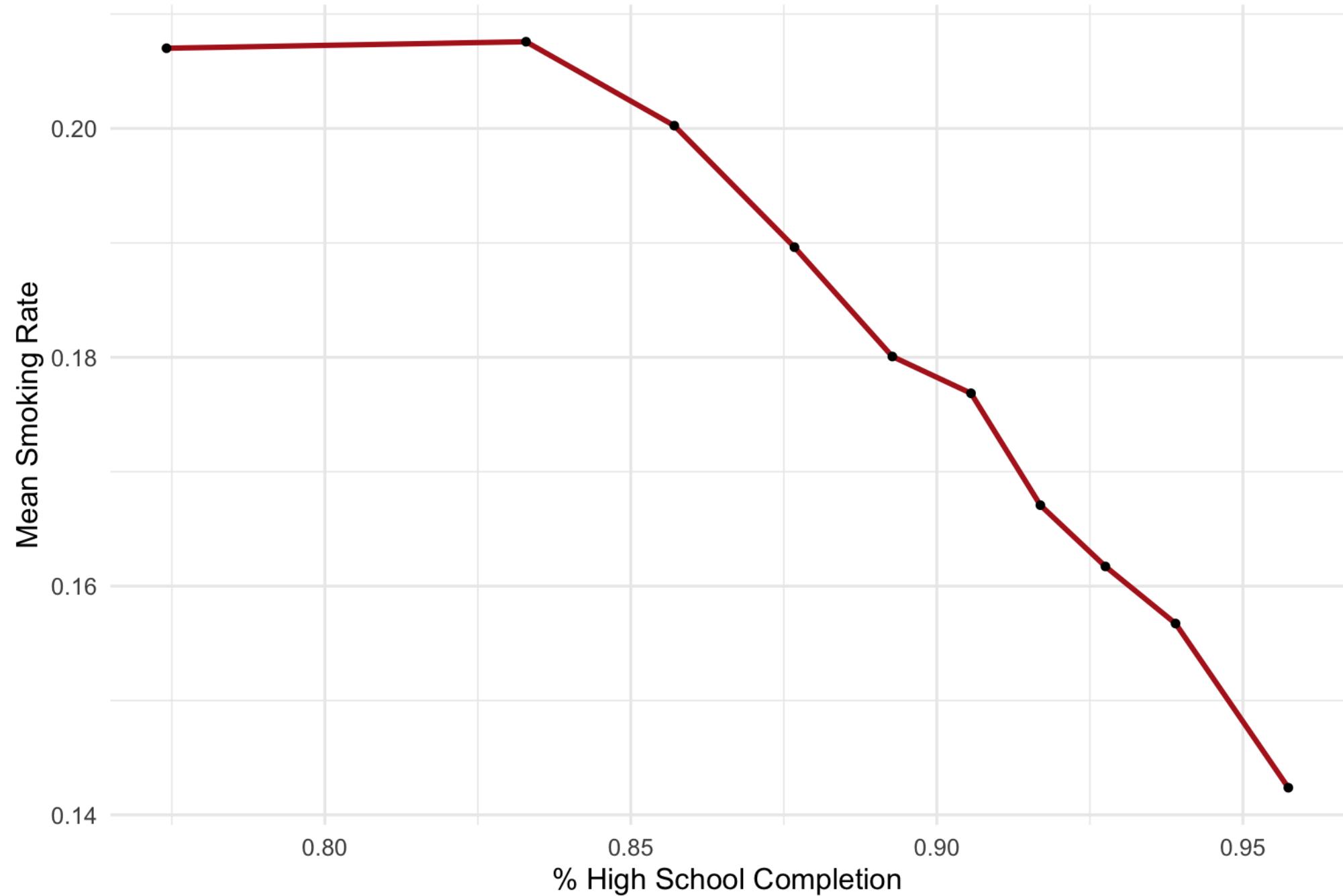
Future Work

- Deeper Analysis of Race Variables
- County-Level & Geographic Focus



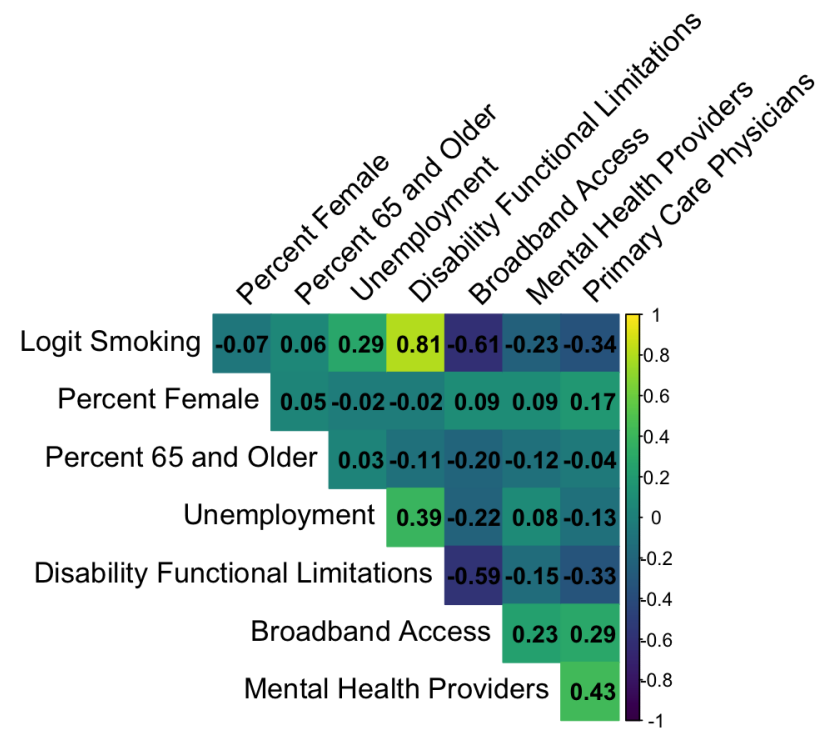
Questions?

Smoking Rate by High School Completion

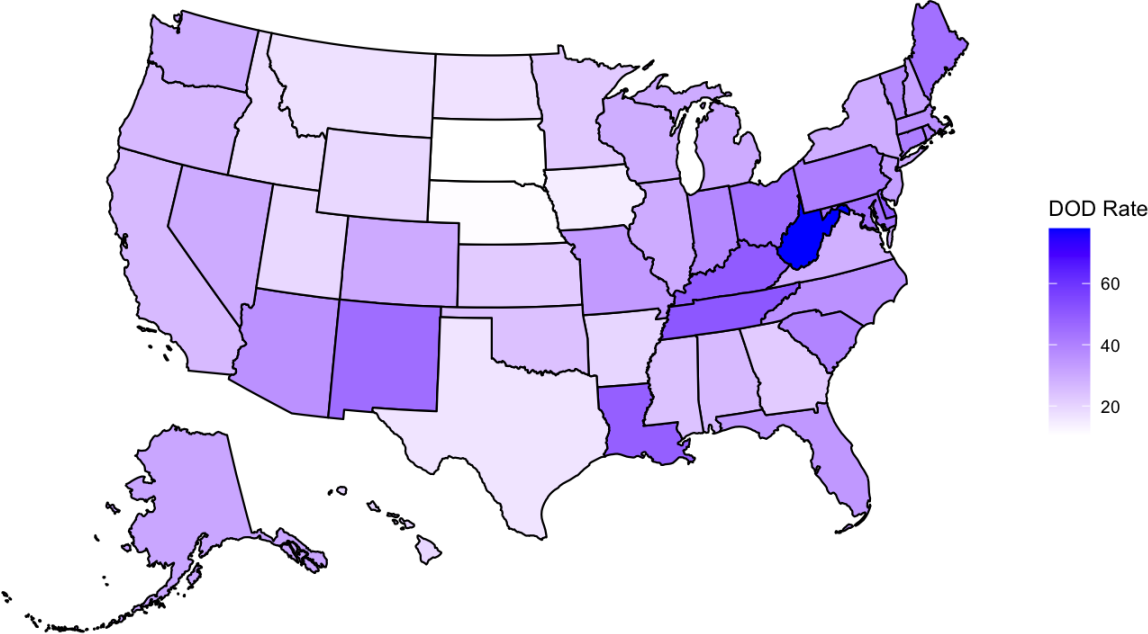


Appendix

Correlation Matrix: Smoking, Mental Health & Key Predictors



Drug Overdose Deaths Per 100,000



Alcohol-Impaired Driving Death Per 100,000

