

What contributes to Preventable Hospital Stays?

The influence of food environment, income, and race
By Megan Le & Gabby Cordelli

Preventable Hospital Stays

What is it?

- Inpatient stays in the hospital for ambulatory care-sensitive conditions (ACSCs)
 - Could have been treated with lower level care in its earlier stages, but now requires hospitalization
 - Examples: COPD, Diabetes, high BP
 - Why?...
 - An individual's health is neglected for a variety of reasons, we sought to explore more about specific factors contributing to this, and the story behind them
 - Hospital care is one of the largest expenses in healthcare
 - Reducing preventable hospital stays

Why Do We Want to Look at PHS?

Not only do PHS burden hospital resources, they also pose a financial burden on patients. A burden that could be avoided under properly advised circumstances...

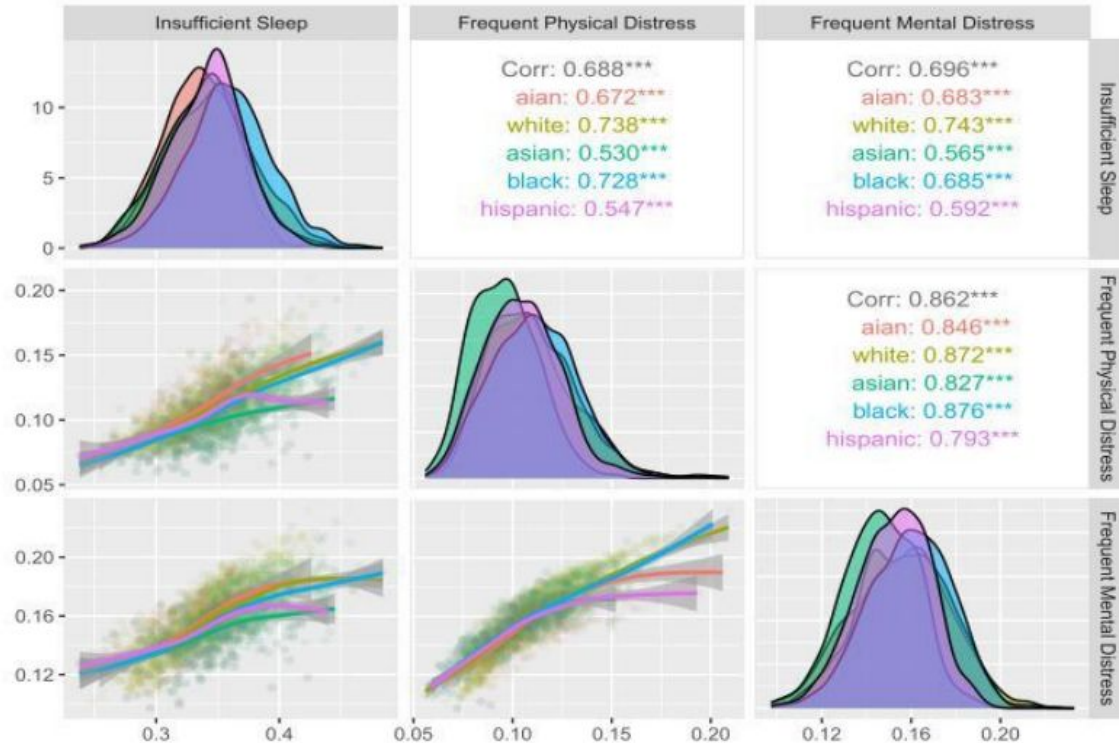
- ❖ Hospital care is one of the largest expenses in healthcare
- ❖ Reducing preventable hospital stays leads to potential savings

This issue compounds itself when considering the demographic makeup of high rates of PHS per county

- It has been found to be intrinsically tied to race and income (McDermott et al, 2017)
 - This, in turn poses a threat of vicious cycling of individuals of color living in low income communities experiencing compounded rates of PHS

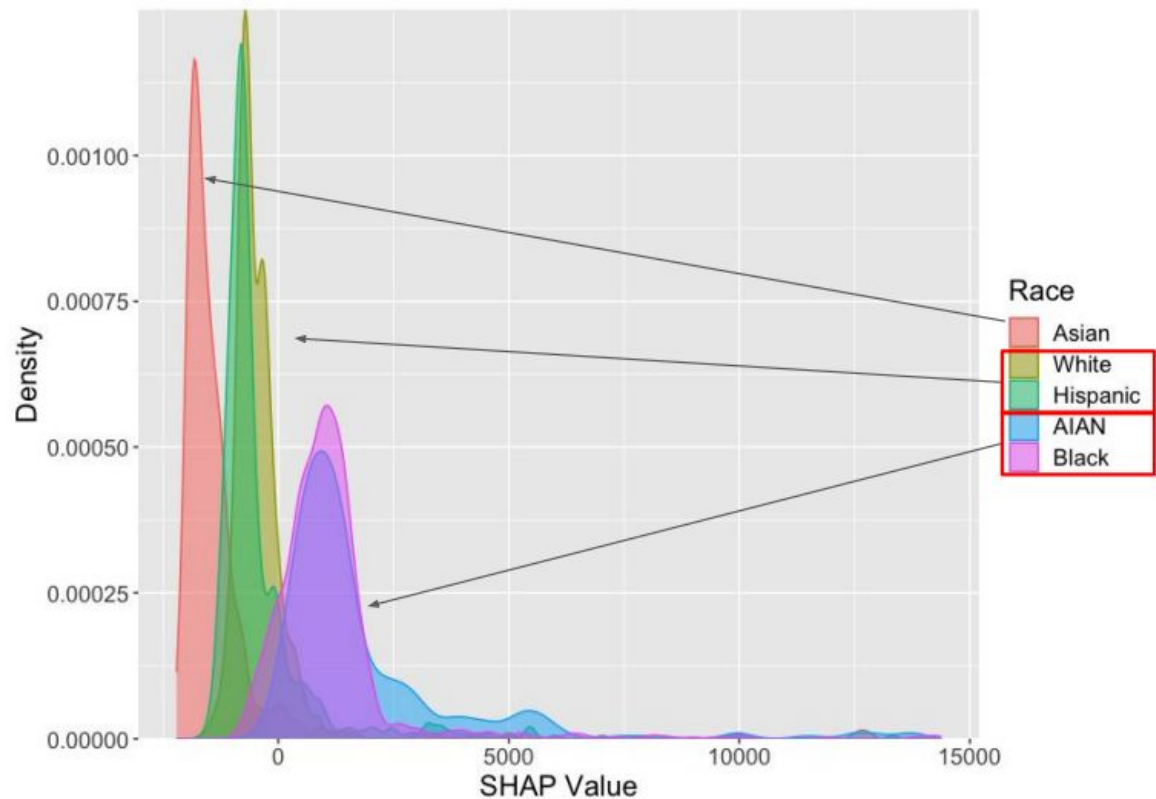
Previous Work

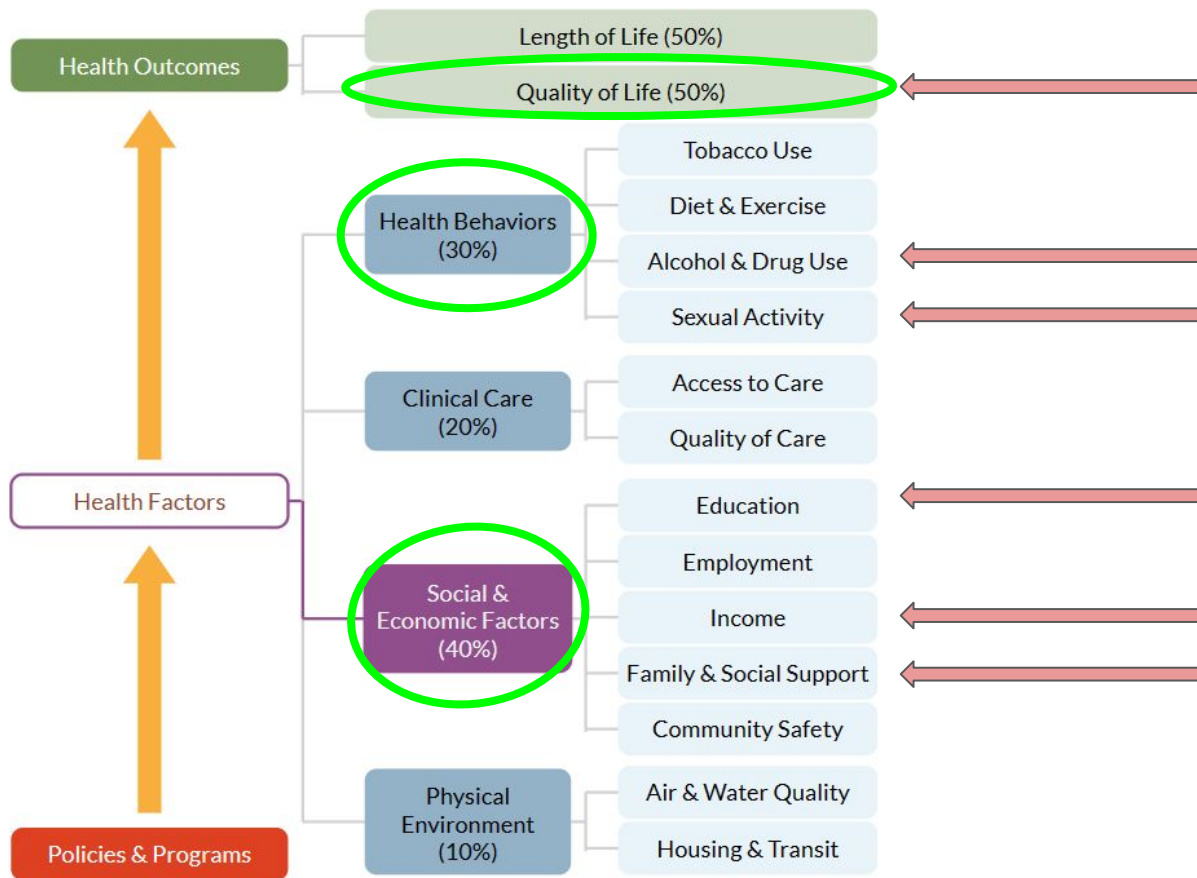
Sleep deprivation, physical and mental distress are positively correlated pairwise across all racial groups.



Previous Work

Three racial clusters vary in predicting Preventable Hospital Stays





County Health Rankings model © 2014 UWPHI

Data:

County Health Ranking
and Data map
*University of Wisconsin
Population Health Institute*

Look into new variables

Income:

Free or Reduced Lunch in Public Schools

Median Household Income

Health Behaviors:

STI Infections

Teen Birth

Food Environment Index

Quality of Life:

Diabetes Prevalence

HIV Prevalence

Family and Social Support:

Social Associations

Childcare Cost Burden

Child in Single Parent Household

Education:

Some college

Disconnected Youth

School Funding Adequacy

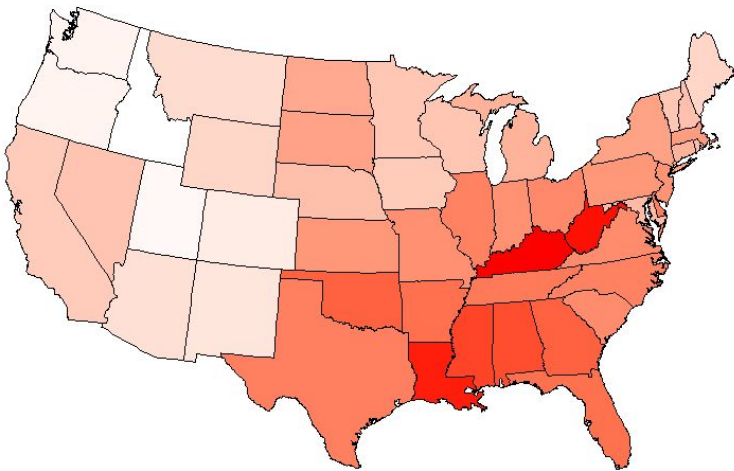
School Segregation

Alcohol & Drug Use:

Excessive drinking

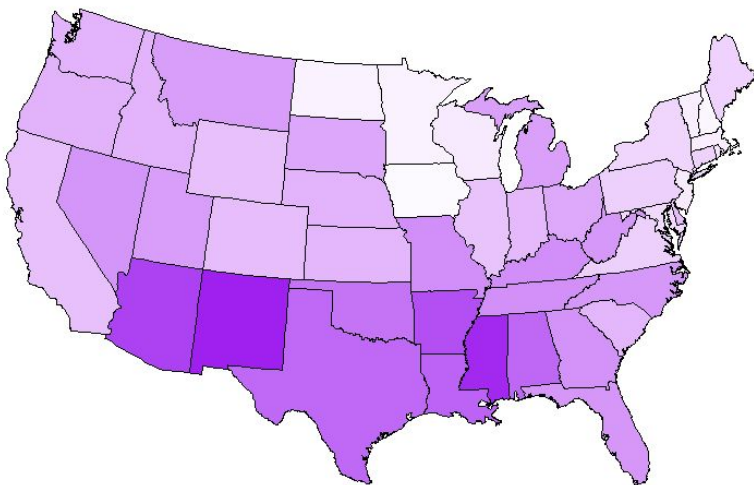
Drug Overdose Death

Southern states have higher PHS and lower food index values



Mean PHS Rate

200 250 300 350 400



Mean Food Index

6 7 8



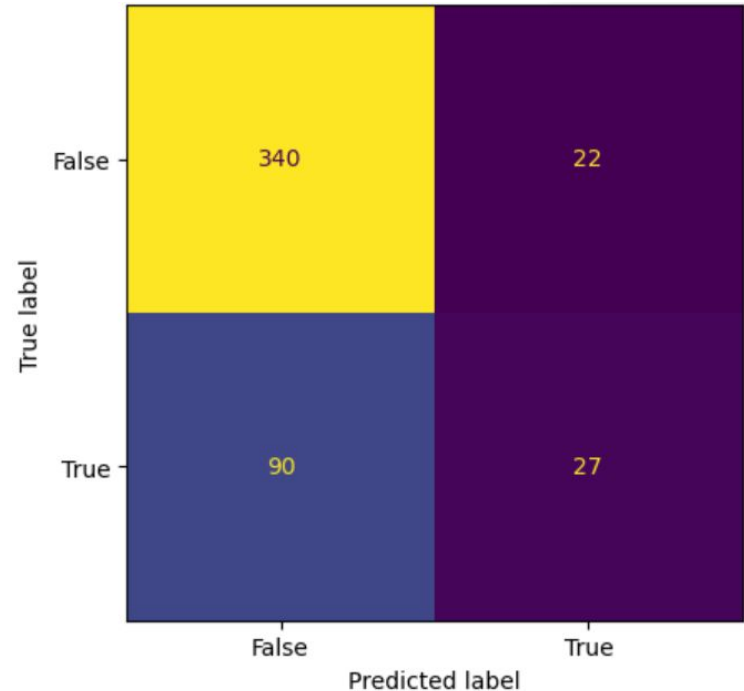
- Higher PHS with lower median income and lower food index

Initial Exploratory Evaluation

- First, we ran a simple KNN model to determine the aggregated importance of various Social, Economic and Health related behaviors on PHS (Preventable Hospital Stays)...

76% accuracy rate

25% of counties are high risk



A Deeper Look

- As we found a significant interaction between an aggregation of key variables and number of preventable hospital stays per county, we decided to dive deeper into **variable importance**
- This is necessary to determine what factors present the largest contribution concern for PHS

Random Forest Model



Conclusion

We see a clear connection between both...

- a) Food Environment and Diabetes
- b) Median Household Income and Single-Parent Households

Additionally, we see racial makeup as strongly related to PHS

- What is our take away from this?
 - An impoverished food environment with poor nutritional access can lead to higher rates of malnourishment, increasing risk of diabetes (one of our common illnesses for PHS)
 - Unsurprisingly, income related variable also rate highly in importance, as impoverished food environments are often associated with low income neighborhoods and food deserts

<https://hcup-us.ahrq.gov/reports/statbriefs/sb259-Potentially-Preventable-Hospitalizations-2017.jsp>

<https://www.countyhealthrankings.org/>

Thank you for your time LMI Consulting!