Mapping Heart Disease Mortality and Income Disparities in the U.S.

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1 Aim

Heart disease is the leading cause of death in the U.S., but the rates aren't equal across all states. Income is one possible factor that could help explain these differences. This project will explore how average income levels in each state relate to heart disease mortality rates. I'll use public data from the U.S. Census and CDC, clean and combine the datasets in R, and create visualizations to examine any patterns.

2 Question

Do states with lower income levels tend to have higher heart disease mortality?

3 Scope and System

The analysis focuses on U.S. states. It looks at income (a socioeconomic factor) and heart disease mortality (a health outcome) and whether there's a connection between them. The system includes state-level data, and the unit of analysis is the state.

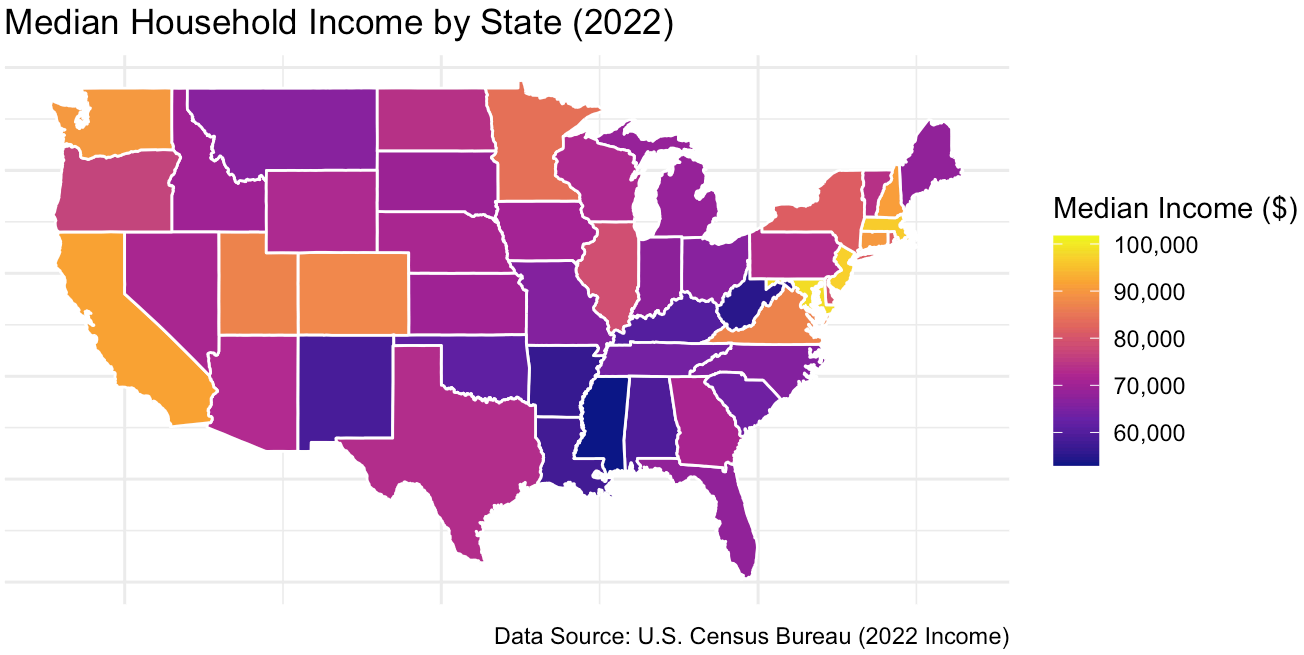
4 Methods

Data on state-level median household income for 2022 were collected using the `tidycensus` R package from the U.S. Census Bureau's American Community Survey (ACS) 5-Year Estimates. Data on heart disease mortality rates for 2020 were downloaded from the CDC WONDER Underlying Cause of Death database. Both datasets were cleaned and formatted to ensure that state names matched correctly for joining. The two datasets were merged by state. To explore patterns between income and mortality, several visualizations were created: maps showing the geographic distribution of each variable, histograms showing the spread of values, and a scatterplot examining the relationship between income and mortality. Figures were made using ggplot2 and organized in Quarto.

5 Results

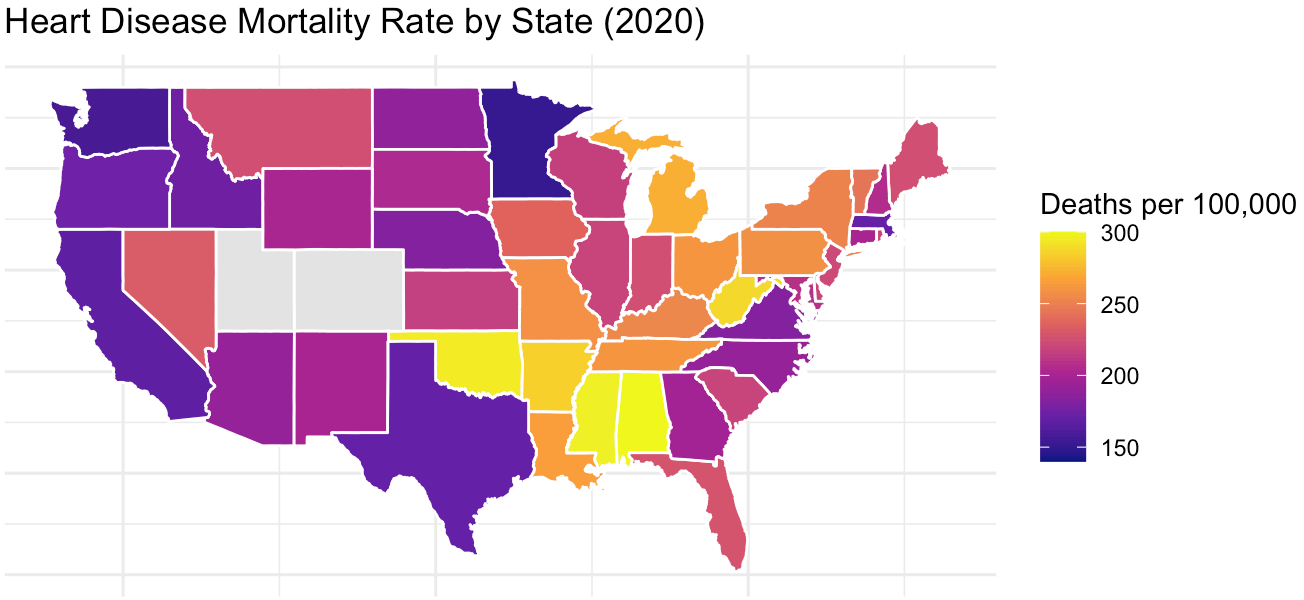
5.1 Map of Median Household Income (2022)

Median income varied across states, with northeastern states and California showing higher incomes. Southern states generally had lower incomes.



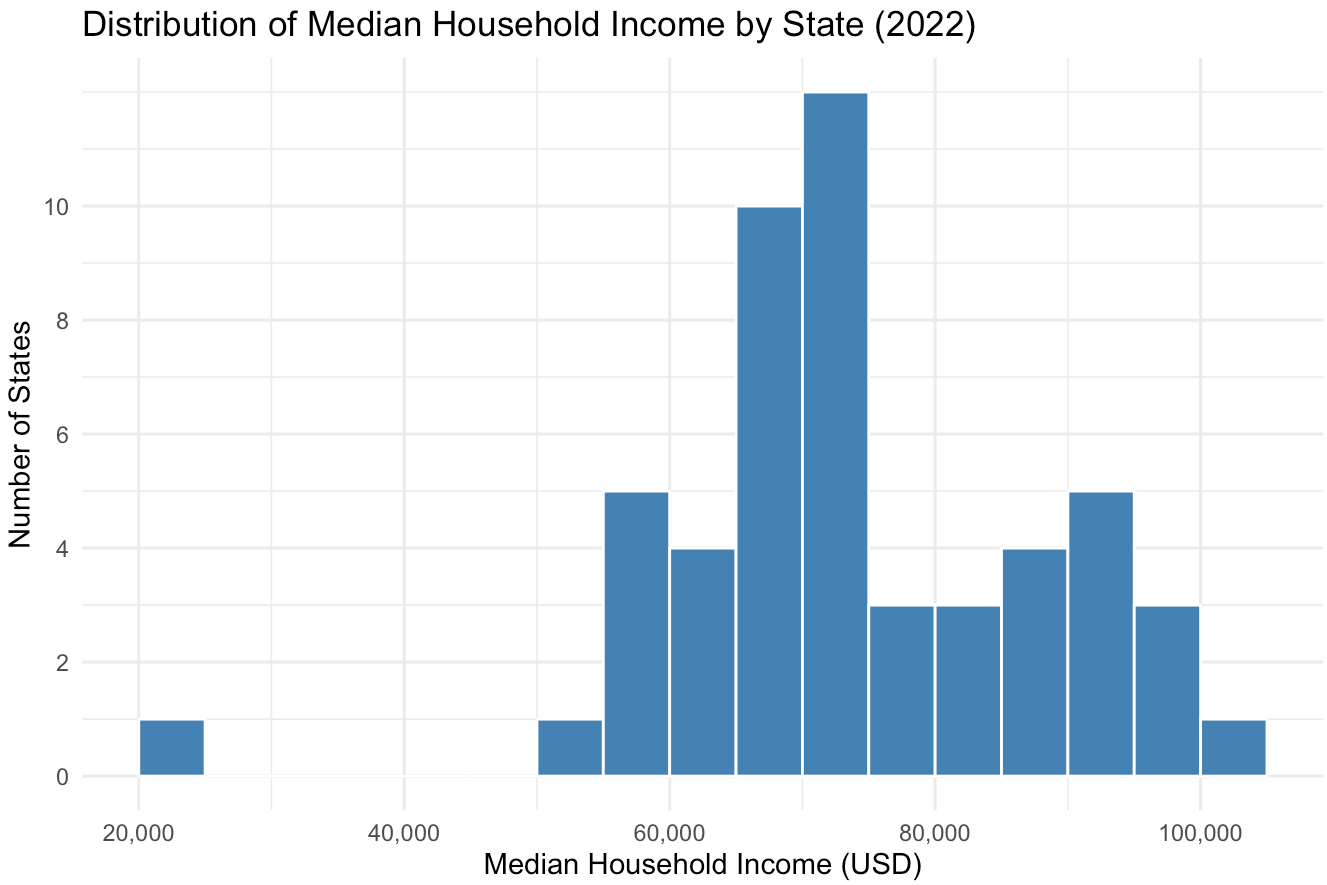
5.2 Map of Heart Disease Mortality Rate (2020)

Heart disease death rates were higher in the southeastern U.S., while states in the West and Northeast had lower rates.



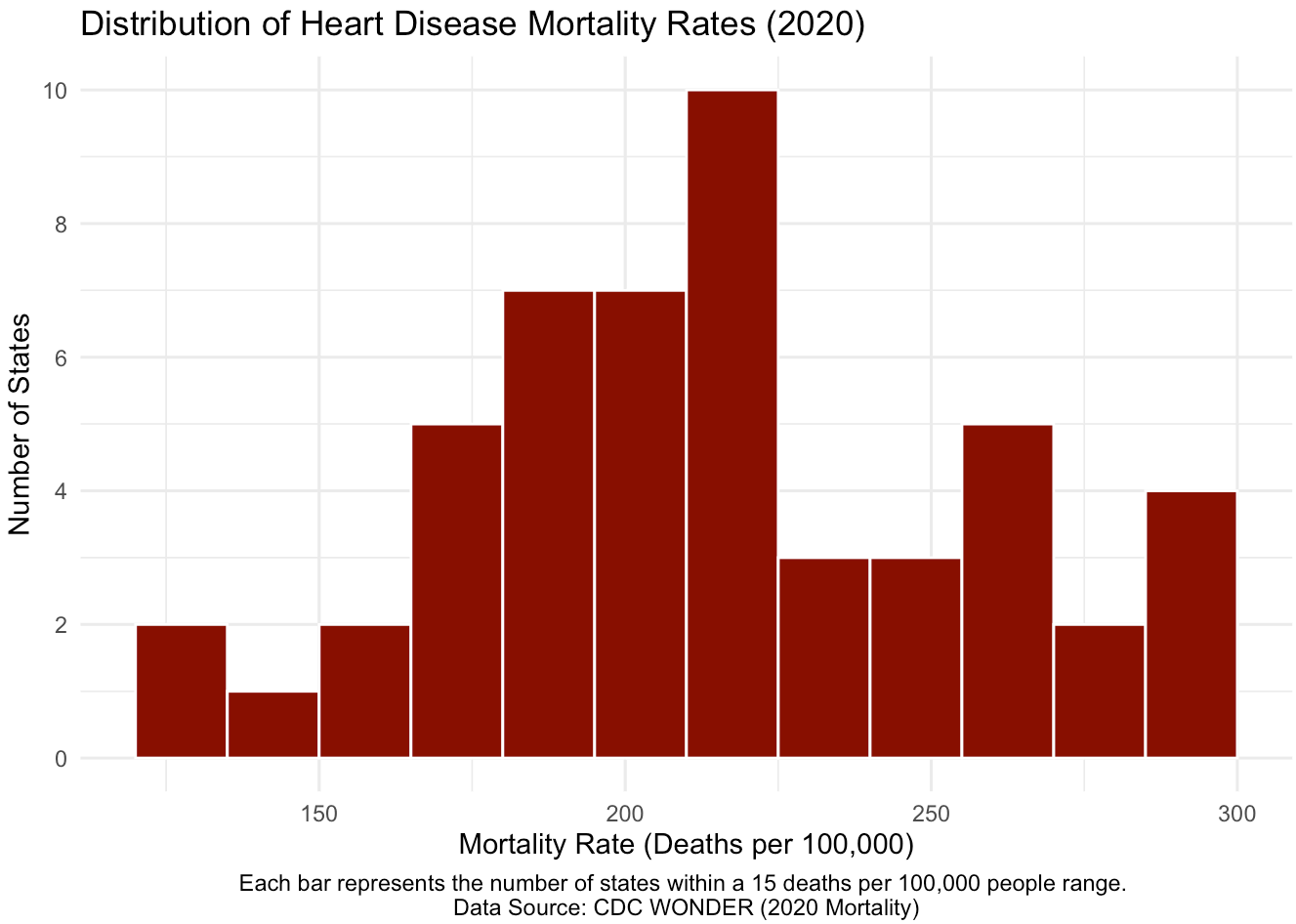
5.3 Histogram of Income

The income distribution was somewhat right-skewed, with most states clustering between $50,000 and $80,000.



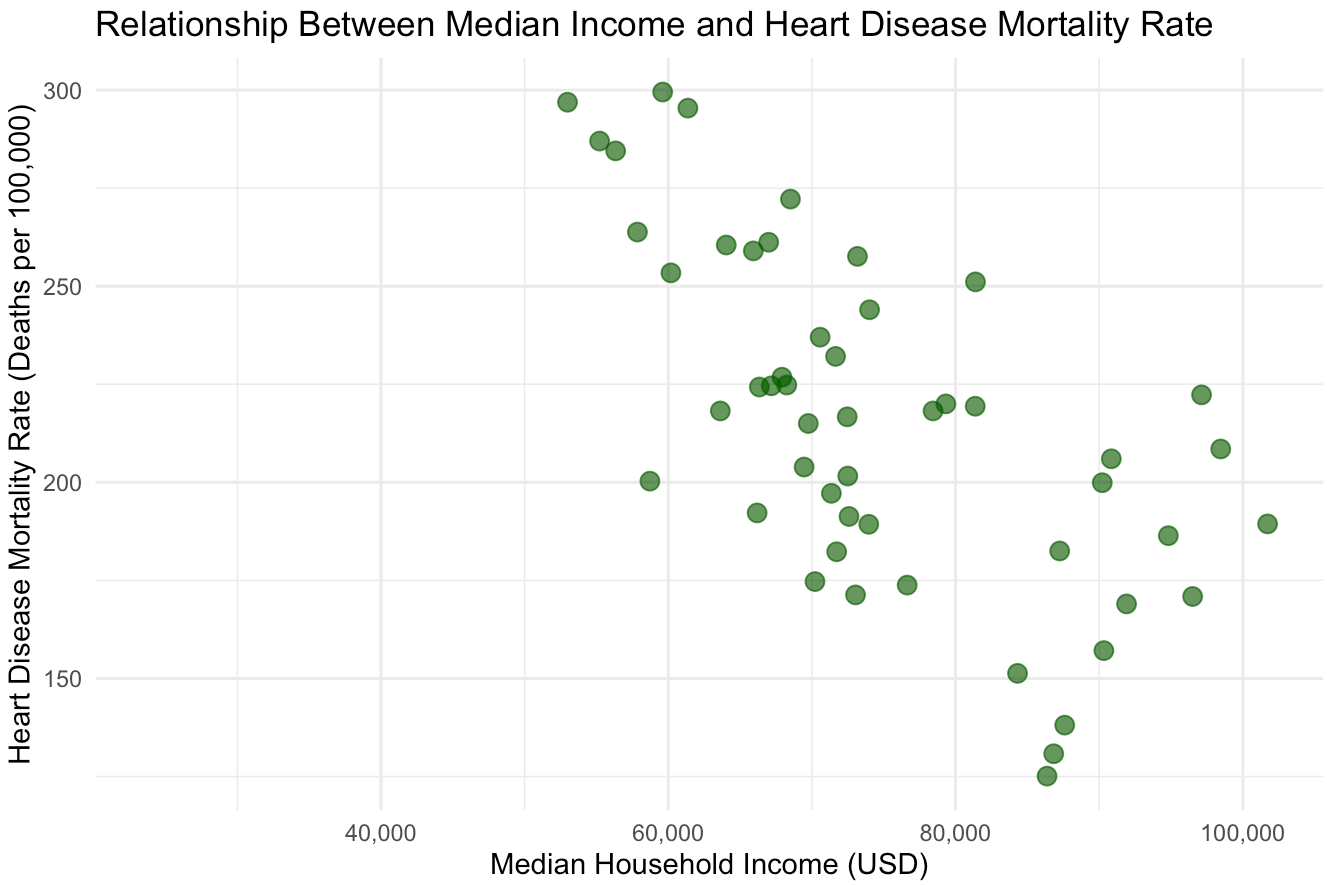
5.4 Histogram of Heart Disease Mortality

Heart disease mortality rates were also right-skewed, with many states falling between 150 and 250 deaths per 100,000.



5.5 Scatterplot of Income vs. Mortality

There was a negative trend: states with higher median income tended to have lower heart disease mortality rates, although there was some spread.



6 Discussion

This project explored the connection between income levels and heart disease mortality across U.S. states. The results showed that higher median household income was generally associated with lower mortality rates, which matches patterns found in previous research. The South, which had lower incomes, also had higher mortality rates. Some outliers existed, but the overall trend was clear. This suggests that socioeconomic status could be a major factor influencing health outcomes. Solving health disparities would likely require broader policies addressing income inequality, healthcare access, and education. Future work could explore how additional variables like healthcare availability or insurance coverage affect mortality rates. While this project focused on data from 2020 and 2022, a longer time trend analysis could provide more insights into whether gaps are widening or shrinking.

7 References

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